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Soviet Geography: Review and Translation

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Readers are invited to send in their comments and discussion of articles published in *Soviet Geography*. Readers are also encouraged to submit suggestions as to published Soviet geographic literature worthy of translation. Such suggestions should relate to articles of general substantive or methodological interest rather than materials of narrow, specialized appeal.

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TRANSLITERATION TABLE

Russian			English	Russian			English
А	а	*а*	a	Р	р	*р*	r
Б	б	*б*	b	С	с	*с*	s
В	в	*в*	v	Т	т	*т*	t
Г	г	*г*	g	У	у	*у*	u
Д	д	*д*	d	Ф	ф	*ф*	f
Е	е	*е*	e*	Х	х	*х*	kh
Ж	ж	*ж*	zh	Ц	ц	*ц*	ts
З	з	*з*	z	Ч	ч	*ч*	ch
И	и	*и*	i	Ш	ш	*ш*	sh
Й	й	*й*	y	Щ	щ	*щ*	shch
К	к	*к*	k	Ъ	ъ	*ъ*	"
Л	л	*л*	l	Ы	ы	*ы*	y
М	м	*м*	m	Ь	ь	*ь*	'
Н	н	*н*	n	Э	э	*э*	e
О	о	*о*	o	Ю	ю	*ю*	yu
П	п	*п*	p	Я	я	*я*	ya

(*) Instead of e, use ye at the beginning of names, after vowels and after the soft sign (').

The transliteration table is supplied for the general information of readers and to enable them to identify the geographic names on maps that will be reproduced from time to time in SOVIET GEOGRAPHY.

The transliteration system is the one proposed by the United States Board on Geographic Names. For more general use in textbooks and other popular needs, the following simplifications are recommended by the editor of SOVIET GEOGRAPHY:

1. Eliminate the use of (') and (").
2. Use i for iy, and y for yy.
3. Convert diphthongs ay, ey, oy, uy to ai, ei, oi, ui.

THE THIRD CONGRESS OF THE GEOGRAPHICAL SOCIETY OF THE USSR

THE LAW ON HIGHER EDUCATION AND THE PROBLEMS OF UNIVERSITY GEOGRAPHY

By A. M. Ryabchikov

(Abstract: Professor Ryabchikov, Dean of the Geography Faculty of Moscow University, finds that Soviet teachers colleges are adequate to supply geography teachers to the middle schools, especially in view of a gradual reduction of the number of class hours devoted to geography in those schools. He sees the primary function of university geography as the training of specialized geographers for industry, agriculture and other segments of the national economy. Universities are therefore urged to reorganize their curricula from the present somewhat academic approach to a greater practical and applied content that would benefit graduates in their new jobs. The author calls on universities to strengthen their ties with industry by taking advantage of the Soviet system of contractual research for production organizations.)

Universities play an important part in the development of Soviet geography both in training young geographers and in organizing scientific research and developing the theory of geographic science. Geography is now represented at 30 of the 40 universities of the Soviet Union. Five of these universities prepare geographers in daytime, evening and correspondence divisions, 18 in daytime and correspondence divisions, 6 only in daytime divisions and 1 only in a correspondence division. In 1958 there were 160 doctors of geographic sciences in the USSR and 1,440 candidates, 54 per cent of whom were working in higher educational institutions, mainly universities. This is a considerable force.

Russian university geography has a rich history going back to the time and fruitful activity of the founder of Moscow University, the great M. V. Lomonosov, and is closely linked with Moscow and Leningrad universities, the oldest and largest in the Soviet Union. Although Russian university geography is more than two centuries old, its vigorous development dates from the last four decades of the Soviet Socialist state. In pre-Revolutionary times, for example, Moscow University trained a little more than 100 geographers while in 42 years of Soviet rule more than 2,500 geographers were graduated from that university alone.

The history of university geography in the Soviet period began in 1918, when the first geographic educational institute was created in Leningrad, setting to a certain extent the standard for the geography faculties and divisions that arose in its wake in the universities. Having fulfilled this role, this institute subsequently merged with the geography faculty of Leningrad University because the university type of institution was recognized to be more economical than small independent institutes.

Of great significance for the development of geography in the higher and middle schools was the decree of the Central Committee of the Communist Party and Soviet Government, dated May 16, 1934, "On the teaching of geography in the primary and middle schools," after which were created most of the present geography faculties and divisions in the universities and teachers colleges.

A prominent role in that active period of development of higher geographic education in the USSR was played by the following professors of Moscow and Leningrad universities: A. A. Kruber, A. A. Borzov, Yu. M. Shokal'skiy, B. B. Polynov, L. S. Berg, Ya. S. Edel'shteyn, N. N. Baranskiy, I. A. Vitver, S. G. Grigor'yev, A. A. Grigor'yev, I. S. Shchukin, A. S. Barkov, B. F. Dobrynin, B. P. Orlov, A. V. Voznesenskiy, F. N. Krasovskiy, L. K. Davydov, I. P. Gerasimov, K. K. Markov, N. N. Zubov, S. V. Kalesnik, N. N. Kolosovskiy, S. D. Muraveyskiy, K. A. Salishchev, P. N. Stepanov, V. N. Sukachëv, B. P. Alisov, S. P. Khromov, S. P. Suslov; as well as G. I. Tanfil'yev of Odessa University, A. N. Dzhavakhishvili of Tbilisi University, N. L. Korzhenevskiy of Central Asian University (Tashkent), V. N. Sementovskiy of Kazan' University, V. A. Kondakov, of Perm' University, M. N. Mirotvortsev of Voronezh University, and others who have written textbooks and trained students and disciples, created new chairs and thus solidly established geography in the universities. An exceptionally important role was played in the formation of a geographic outlook and in stimulating an interest in geography among Soviet youth by Professors N. N. Baranskiy, I. A. Vitver, A. S. Barkov and A. A. Polovinkin, who wrote excellent textbooks on the economic and physical geography of the USSR and foreign countries for the middle schools, and by Professor Yu. M. Shokal'skiy, who compiled a geographic atlas for the middle schools. New generations have been brought up on these repeatedly republished textbooks for a quarter of a century.

Let us note in passing that the status of geography in the middle schools has now deteriorated compared with the positive results yielded by the 1934 decree of the party's Central Committee concerning the teaching of geography in the schools. The number of hours devoted to geography has been reduced, examinations in the upper classes have been abolished, and, the excellent geography textbooks and syllabus compiled by Professors N. N. Baranskiy and I. A. Vitver have been replaced by textbooks and syllabuses of inferior quality. The present state of geography in the middle schools does not meet the requirements of the recent law on school reform and a closer tie -in between school and life. The middle schools have lately failed to equip Soviet youth sufficiently with up-to-date knowledge about the development of the geographic environment and the role of natural and economic conditions in the development of the national economy and especially of their local areas. Many years' experience in the holding of competitive university entrance examinations in geography has convinced us of this beyond the shadow of a doubt. In addition to the need for raising the role of geography in public education and the scientific level of geography textbooks and syllabuses in the middle schools, a major part can be played

by geography teachers in stimulating local-area studies, both in class and in the field.

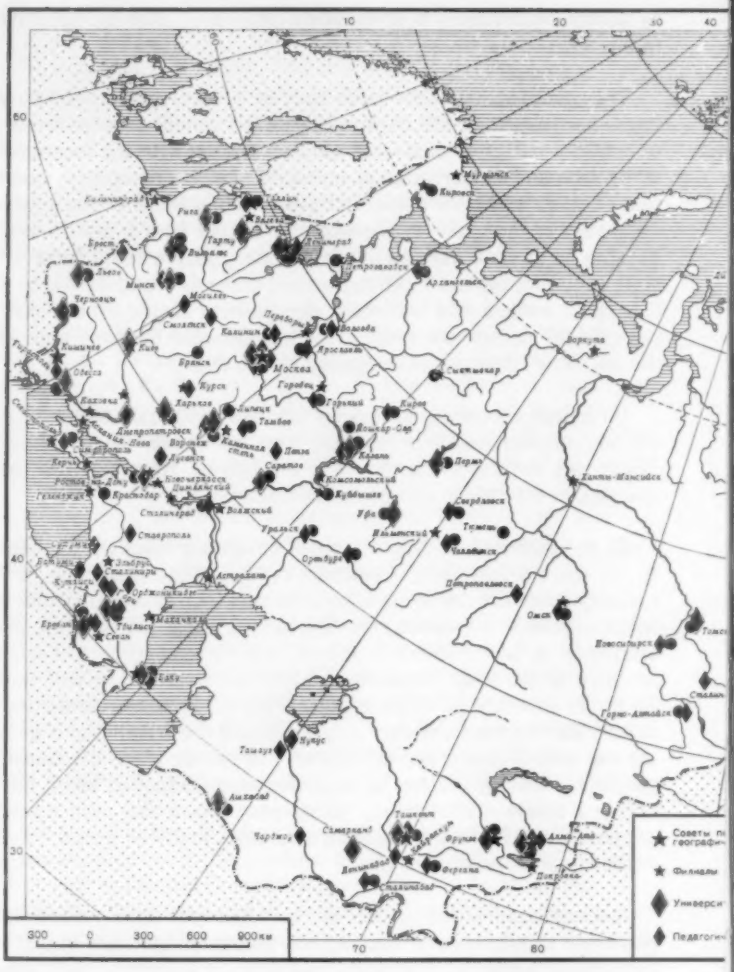
The participation of the large body of middle-school geography teachers (there are more than 80,000 in the Soviet Union) in government-sponsored or publicly initiated local-area studies dealing with the inventory, rational utilization and conservation of renewable natural resources, quality evaluation of lands and other useful activities connected with the economic development of the local area, rayon, collective farm or state farm, and the passing on of such working habits to young people could become one of the most important factors in strengthening geography and its tie-in with life. It is quite evident that university geographers should all the more be concerned with strengthening the close ties between teaching and research, on the one hand, and practical needs, on the other.

Up to now university geography has had traditional ties with public education, research organizations and a number of producer organizations. These ties should be maintained in the future. However, life requires changes in the nature of these relationships.

At the present time middle-school geography teachers are being trained by 30 universities and 62 teachers colleges (see map on pp. 6-7). Leaving aside the unresolved question of which type of institution trains better teachers, we would only like to note that in view of the skimping on geography at the middle-school level a geography teacher in a middle school having a single staff cannot have a full teaching load limited to geography. As far as possible he is given other subjects to teach. Under these conditions the teachers colleges, by combining the training of a geography teacher with that of a biology teacher, of course place the combined geography-biology teacher at an advantage by assuring him a full salary rate in a single-staff school. Experience shows that such a combination of geography and biology training is also quite justified from a scientific methodological point of view.

It would seem that a natural division has thus been marked out: university graduates should become specialized geography teachers in multi-staff schools (with several parallel classes), found mainly in cities, while graduates of teachers colleges should become combined geography-biology teachers in single-staff schools, found primarily in rural areas. But a number of other factors also come into play: the jurisdictional affinity of public schools and teachers colleges, housing and living conditions, the need for geography teachers in urban as opposed to rural schools, the old question of whether universities or teachers colleges prepare better teachers and so forth. As a result specialized geography teachers with a university education are still being assigned predominantly to single-staff middle schools, where half their teaching load consists of subjects other than geography.

The large number of teachers colleges and the reduction in the number of geography class-hours in the middle schools face university geography



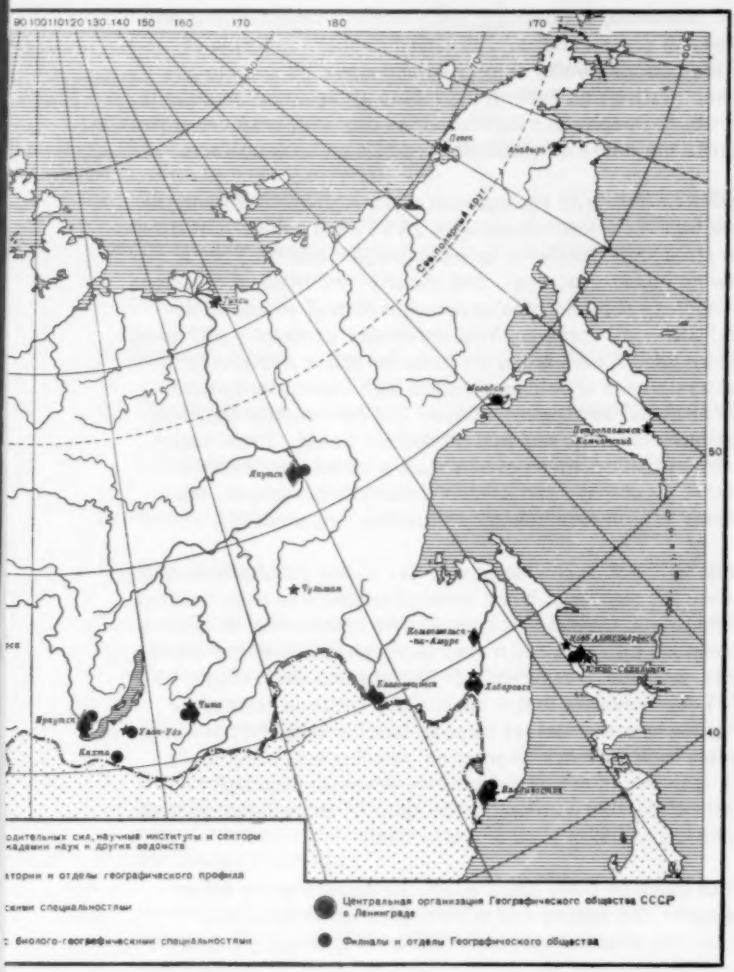
Geographic Institutions of the USSR

(Legend:) Councils on the Study of Productive Forces, research institutes and geographically-oriented sections of the Academies of Sciences and other agencies

Branches of institutes, observatories and geographically oriented departments

Universities with geography specialties (majors)

Teachers colleges with biology-geography specialties (majors)



Central organization of the Geographical Society USSR in Leningrad

Branches and sections of the Geographical Society

with the problem of broadening its contacts with research organizations and especially with producer organizations. The jurisdictional scattering of geographers' positions among twenty ministries and agencies and the absence of "geographer" listings as such in the tables of organization make it difficult for university geography to establish close ties with producer organizations. Nevertheless the future of geography depends on such contacts.

The reorganization of industrial management along regional lines and the establishment of regional economic councils in 1957, the public-education reform designed to strengthen the tie-in between schools and life, particularly the 1958 law on higher education, and, finally, the historic decisions of the 21st party congress regarding the seven-year plan of economic development of the USSR -- all these confront university geography with great tasks and open before geographers broad horizons for active assistance to the economy. That assistance should be directed both toward agriculture (quality evaluation of lands) and toward industry and construction (regional planning, inter-regional and intra-regional production links). There seems to be a basis for saying that all these events mark a turning point in the development of Soviet geography, particularly university geography, that requires basic reforms both in research and in the teaching process.

It is not just a question of making some changes in the geography teaching programs, to increase the number of hours devoted to practical work in class and in the field, and to add several new courses and seminars of an applied character to the program. Life requires a more thorough reform of the entire system of university geography, especially of the research work of the teaching staffs. It is self-evident that if specialists are to be trained for practical work, the teachers themselves must be familiar with the needs of practical work, relate their research to practical requirements, and apply the results of such research in actual production. Wherever university geographers maintain close ties with production groups, there is no problem in placing geography graduates in such organizations.

We should like to touch on three basic questions related to the reform of university geography: the system and the organization of university geography education, the direction and organization of geography research in universities, and the growth of geography-teaching staffs in universities.

The system and organization of higher geography education in the USSR, the structure of the geography faculties (the composition of departments and laboratories) (see Table I on p. 9), the listing of specialized geographic disciplines, and the make-up of teaching programs and syllabuses reflect the theoretical level and the understanding of the scientific nature of geography and its role in the economy, sciences and culture of the country.

As a result of the development and differentiation of the sciences, geography has broken down in more than twenty independent geographic sciences, each of which has its object and its methodology of study. Some Soviet authors, carried away by that differentiation, are even inclined to

Table I

System of Geographic Sciences
adopted at Soviet universities

1. Geography

2. Physical geography
   - 2a. General earth science
   - 2b. Physical regional geography and landscape science

3. Paleogeography

4. Geomorphology

5. Climatology

6. Oceanography

7. Hydrology of the land

8. Geocryology (frozen-ground studies, snow studies, glaciology)

9. Soil science

10. Geochemistry of landscapes (migration and interchange of matter among components of the landscape sphere)

11. Biogeography (botanical geography, zoogeography, phenology, medical geography)

12. Economic geography
    - 12a. World economic geography
    - 12b. Economic regional geography

13. Historical economic geography

14. Geography of natural resources

15. Geography of population

16. Geography of energy

17. Geography of industry

18. Geography of construction

19. Geography of agriculture

20. Geography of transportation and communications

21. Urban geography

22. Geography of services (health, culture, trade)

23. Regional geography and local-area studies

24. Cartography

25. Toponymics

26. History of geography

state that geography as a science has ceased to exist. According to that view, geography merely embodies the name of the group of geographic sciences, which are independently studying various aspects of the geographic environment. We support another point of view.

As we understand it, geography is the science concerned with the earth's landscape sphere, which arose as a result of the interpenetration and joint development of the earth's crust, the troposphere, the hydrosphere and the biosphere. With the appearance of human society, the landscape sphere became man's geographic environment. Man's active role and his powerful material and technical equipment are inseparable from the geographic environment and constitute one of its principal qualities. Present-day geography, based on the laws of dialectical and historical materialism regarding nature and society, therefore studies the development and qualitative manifestations (types) of the geographic environment under the growing influence of production, as well as the utilization and transformation of the geographic environment by man. Since mankind is inseparable from the landscape sphere and represents one of its parts, geography must also be concerned with the study of the natural conditions and the social laws of the geographical distribution of population and its migrations.

In the present day and age, however, only a few erudite scholars are qualified to concern themselves with the entire complex of geographic and philosophical problems. Such problems must usually be studied by interdisciplinary teams. That fact and, in part, a false fear of mingling the laws of nature and society explain the paucity of inter-disciplinary (integrated) regional studies in the Soviet geographical literature. Soviet regional-geography studies are usually either physical or economic in character.

Despite the fact that geography is represented at its broadest level in universities, the experience of recent years (except in the middle schools) has tended to stimulate a concretization and differentiation of geography, and most of the younger geographers are seeking out increasingly specialized disciplines. However, progress in the specialized geographic disciplines will inevitably require a higher synthesis and, looking into the future, we are convinced that a "single", or better said an integrated, geography will not lose its scientific personality.

Together with an integrated study of the geographic environment as a whole or by regions (regional geography, local-area studies), it is quite natural for geography to study the laws of development and distribution of two major components of the environment: the natural landscapes and the territorial complexes of productive forces. The former develop according to the laws of nature, and the latter according to the laws of society. Thus arises the need for the existence of two major geographic sciences - physical geography and economic geography (see Table I on p. 9).

Physical geography studies the natural landscapes of the earth's surface, zonal (world-wide) laws and regional conditions under which landscapes

arise and develop, the migration of matter within landscapes, and changes in natural landscapes as a result of the process of production. The natural part of the geographic environment can and should be studied as a whole (general earth science) and in terms of actually existing natural territorial complexes (natural regions and landscapes) that arose in the process of development of the natural environment (typology of landscapes and regional physical geography).

At the same time the concrete forms of development of the geographic environment, or of its components, are so diversified and important in the life of man that they must also be studied separately. Hence the need for the existence of independent physical-geographic disciplines: paleogeography (the history of development of landscapes), geomorphology (the origin and development of land forms), climatology, oceanography, hydrology of the land (surface runoff, hydrology of streams, lakes and man-made reservoirs), geocryology (ground-frost studies, snow studies, and glaciology, i.e., the study of the laws of development of "permanent" and seasonal ground frost, the origin and development of present-day glaciers), soil science, the geochemistry of landscapes (the laws of migration and exchange of matter between components of the landscape sphere), biogeography (the geographic aspects of botany and zoology: the study of forest types, meadow studies, swamp studies, types of zoocoenoses, phenology, medical geography etc.). It should be noted that these physical-geographic disciplines, no matter how important, cannot simply replace physical geography because individual components of the natural geographic environment in their joint development do not form a simple sum but rather a new quality that requires separate study. Progress and development of the specialized physical-geographic disciplines do not restrict, but, on the contrary, promote the development of physical geography as an independent science.

Economic geography studies the natural prerequisites and the social laws and conditions of formation and development of territorial complexes of productive forces and their interrelationships, most clearly expressed in the geographical division of social labor. Economic geography also falls into a general part (world economic geography) and a regional part (regional economic geography, i.e., the typology of production complexes and the economic geography of countries and economic regions).

In addition to the integrated study of productive forces as a whole, these forces, in view of their importance for the well-being of mankind, are also studied separately by specialized economic-geographic disciplines. Thus arises the need for the development of historical economic geography, the geography of natural resources, the geography of population, the geography of energy, the geography of industry, the geography of construction, the geography of agriculture, the geography of transportation and communications, urban geography and the geography of services (health, culture, trade, and so forth).

It should be noted that while the physical-geographic disciplines have maintained themselves independently not only in research institutes of the

Academy of Sciences but also in universities, which usually have several (two to ten) physical-geographic departments, the same cannot be said of the economic-geographic disciplines, which are usually concentrated in one or two departments. The organization of the economic-geographic disciplines in the form of separate university departments and specializations is still a matter for the future. At the present time these disciplines are developing mainly in academic and planning institutions. In our view, the most immediate need is for developing the geography of population at the university level.

Cartography occupies a separate and an important place in the family of geographic sciences. Since the map, as stated by L. S. Berg, is both the beginning and the end of almost every geographic study and its clearest form of synthesis, cartography is needed by all geographic disciplines. Cartography is also of great service to other sciences, especially geology.

Finally, there are two other geographic disciplines: the history of geography and toponymics. The latter deals with the origin and the meaning of geographical names, thus bordering on history and philology.

As soon as all these geographical disciplines develop and become essential in practical work, they must be represented in university geography education and combined in geography faculties, which deal with problems relating to the study of the geographic environment, its development, and its utilization and transformation by man and, in training specialists, base themselves on the over-all cycle of basic geographic disciplines that form the necessary foundation for the superstructure of one of the specialized disciplines. The superstructure of specialized disciplines and seminars is generally more flexible depending on the progress of science and the requirements of practice.

Consequently the old dispute among geographers whether universities should promote specialized or integrated geographical studies must be solved by combining the two approaches. Weakening of either approach would retard the development of geography as a whole.

At the present time 18 universities have geography faculties, five have geology-geography faculties and seven have natural-science or biology-geography faculties. Geography as a specialty (major) is represented at 25 universities, physical and economic geography at four, geomorphology and cartography at three, hydrology of the land, meteorology and climatology at six and oceanography at two universities. In addition the Geography Faculty of Moscow University offers the following topical specializations: paleogeography, glaciology, soil geography, plant geography, animal geography, geographical geochemistry, as well as the following regional specializations: physical geography of the USSR, physical geography of foreign countries, geography of polar regions, economic geography of the USSR, economic geography of capitalist and dependent countries (see Table II on p. 13). The Geology Faculty trains specialists in groundfrost studies, and the Biology-Soils Faculty in soil studies. The Geography Faculty of Leningrad University has about the same listing of specialties (majors) and specializations, except for soil geography and the regional specializations.

Table II

Organization of the Geography Faculty of Moscow University

- Dean's Office
  - Faculty Council
  - Research Section
    - Committees on individual research problems and field-work projects
    - Cartographic committee
  - Library
  - Editorial Council
    - Editorial office of Vestnik Moskovskogo Universiteta, seriya geografiya
    - Editorial office of Geografiya i Khozyaystvo
    - Editorial committee on field-work reports and teaching aids
  - Administrative section
    - Main office
    - Personnel office
    - Bookkeeping office
    - Supply department
    - Senior engineer
  - Commission on Teaching Methods
  - Educational Section
    - Daytime division
    - Evening and correspondence divisions
    - Field training stations
      - Khibiny
      - Krasnovidovo
      - El'brus
      - Carpathians
  - Departments
    - General earth science
    - Geomorphology
    - Climatology
    - Hydrology of the land
    - Oceanography
    - Geography of soils and geochemistry of landscapes
    - Biogeography
    - Physical geography of USSR
    - Physical geography of foreign countries
    - Economic geography of USSR
    - Economic geography of people's democracies
    - Economic geography of capitalist countries
    - Polar regions and glaciology
    - Cartography
    - History of geography
  - Laboratories
    - Snow and ice
    - Paleogeography
    - Landscape science
    - Geochemistry of landscapes
    - Soils
    - Hydrology and hydrochemistry
    - Integrated and special-purpose mapping
    - Geodetic and cartographic training
    - Photogrammetry and stereophotogrammetry training
    - Aerial photography
    - Map publication (with mimeograph)
    - Meteorological observatory
    - Herbarium
    - Map collection

One of the most synthetic geographic specialties -- soil science -- has had an interesting jurisdictional history at the universities. In the 1930's, when geography faculties were separated from the previously combined geology-soils-geography faculties, soil science remained as part of the geology-soils faculties until 1948. After the August 1948 session of the Academy of Agricultural Sciences USSR, soil science was transferred to the biology faculties to strengthen the links between it and the development of organic life and agricultural technique. However the isolation of soil science in the biology-soils faculties greatly weakens the geographical basis of the training of soil scientists, who learn little about physical-geographic laws (the zonal-regional sequence of the water-and-heat regime and the interrelationships between soils and landscapes), about mapping methods and about the geography of agriculture, without which the young soil scientist finds it difficult to make an agricultural evaluation of lands, one of the principal tasks of soil science. On the other hand, the geography faculties have been deprived of one of the basic and inseparable components of geography and forced to set up their own soils departments and duplicate soils laboratories. We are convinced that both for soil science and for geography, not to speak of the practical end results, it would be best to transfer the training of soils scientists to the geography faculties.

The training of geographers in Soviet universities follows usually a so-called standard teaching program. The geography faculties of Moscow, Leningrad and Kiev universities have their individual teaching programs, worked out in accordance with the universities' own scientific traditions, the availability of qualified teaching staffs and the existence of laboratory facilities, as well as in keeping with the needs of scientific and production organizations for trained geographers. The individual teaching programs of Moscow and Leningrad universities are quite similar and make it possible to graduate an adequate number of trained young geographers for work in scientific and production organizations. In both universities in training of geographers, both the specialized and the integrated geographers, is based on a broad geographic foundation: 18 per cent of the teaching time (not counting independent work and preparations for reports and examinations) is devoted to social-economic and general academic disciplines, such as mathematics, physics, chemistry and so forth; 20 per cent to broad geographic disciplines; 22 per cent to geographic disciplines in the chosen specialty (major), 32 per cent to practical training and production work, and 8 per cent to the writing of a thesis. The close relationships that exist between the geography faculties of these universities and production and research organizations make it possible to place geography graduates without special difficulties in these institutions according to their specialities. Whenever the various departments of the geography faculties maintain proper liaison with practical needs, particularly through contract work for outside organizations, young specialists with an integrated training in physical or economic geography are just as much in demand in specialized scientific institutes as specialized geographers, such as hydrologists, geomorphologists and others.

The individual teaching program of the Geography Faculty of Kiev University

lies somewhere between the individual programs of Moscow and Leningrad universities, on the one hand, and the standard university program, on the other.

The new standard teaching program adopted for the other universities in 1959 has a number of advantages over the previous standard program, under which the upper-class students are now completing their studies. In the first place, the new program clearly differentiates between the training of future middle-school geography teachers and the training of specialized geographers for production institutions. This differentiation is also true of the individual programs of the above-named three universities. The program of study for teachers is 5 years, and the one for geographers in production work 5 1/2 years. In accordance with this differentiation, work practice increases in volume and becomes more specialized. Second, the new program gives future geography teachers a thorough foundation in geography that enables them not only to teach middle-school geography but also to assist local planning and economic institutions in the study and rational utilization of natural resources by means of a local-area study program. Third, the new program has the advantage of consolidating the position of the "geography" specialty on the basis of practical needs (thus far, to be sure, mainly the needs of the middle schools). This is important from the theoretical point of view because it is sometimes said among geographers that geography as such has ceased to exist, having dissolved into a series of specialized disciplines. It is also important from a practical point of view because if geographers are willing to make the necessary effort they could use the "geography" specialty as a basis for adding new specializations, and later even specialties, that are needed in practice, such as regional planning, qualitative evaluation of lands, the geochemistry of landscapes and so forth. Under the heading of integrated geography the new standard teaching program also provides a course in regional geography: the physical and economic geography of the respective republic or region. One additional advantage of the new program is that it makes it possible to instill in students a taste for several geographic disciplines designated as specializations: physical geography, economic geography, geomorphology and cartography.

At the same time such incomplete geographic specialization also represents the program's greatest shortcoming. Only geographers out of touch with practical needs or some officials of the Ministry of Higher Education could imagine the training of geographers for production institutions as reflected in the teaching program. Only 10 per cent of the total teaching time is devoted to geographic disciplines related to the chosen specialty. That is, of course, very little. There is a danger that Soviet universities will train inadequately qualified young geographers. Even capable graduates trained under such a program will encounter serious difficulties on the job in production institutions, causing dissatisfaction among the management, while less capable graduates are likely to discredit geography. In view of the fact that Soviet geography is only just starting to make serious contributions to economic practice on a broad scale, this situation causes real concern. Even with the 22 per cent of the teaching time budgeted for specialized courses at Moscow University,

the production institutions insist that additional time be set aside for specialized training of graduates. While one can still argue with such demands in the case of the Moscow program by emphasizing the breadth of a university education, it is simply impossible to defend a 10-per-cent time budget allowed for specialized courses.

Although the sample listing of specialized courses that can be chosen under the standard program is quite extensive, the nature of these courses is too academic. There are very few subjects that train the future geographer in working methods. Fortunately the faculty councils have the right to change the listing of specialized courses as they see fit. And the departments that are in close liaison with production institutions should avail themselves of that right and invite experienced production specialists to offer specialized courses.

Another important aspect of university geography is the organization of research work. If geography is to be brought closer to life and to economic practice, not just in words, but in deeds, there is no more effective way at present than to organize the research of the teaching staffs of geography faculties on the basis of contract work for production organizations. Unfortunately far from all geography faculties are engaged in contract work. A more or less significant volume of such contract work is being done by the geographers of Moscow University (5 million old rubles worth per year), Leningrad University (2 million rubles) and Kiev University (800,000 rubles). The other universities are more likely to be planning to do contract work than to be actually engaged in it. The main reason for such caution, it seems to us, is that university geographers are not yet sufficiently ready to be able to do work at the expected practical level. It is much simpler and quieter to do research on one of the approved topics financed by the government's university research budget; in such cases we are our own judges. The valuable research studies will be published, and the routine studies will help fill the scientific archives. To do scientific research under contract to an outside organization is much more complicated and responsible.

But if geographers want to raise the prestige of their discipline by strengthening ties with practical needs, they must take a more aggressive attitude toward contract work. Such work can be useful to geography faculties in many ways. In the first place, it offers a very simple solution to the problem of selecting a topic of current importance; of applying the results of scientific research in practice, and raises the responsibility for completion of the research project. Second, contract work undoubtedly enriches and raises the scientific and practical experience of teachers and makes it easier for them to train qualified young geographers for work in production institutions. Third, contract work offers wide possibilities for on-the-job training of students and for placing graduates after completion of their studies. Fourth, income derived from contract work makes it possible to improve the equipment of geography faculties and to add new laboratories, while the personnel requirements of contract work enable the faculty to employ additional scholars and assistants (the Geography Faculty of Moscow University, for example,

consists of 170 persons). Finally, the lengthy field work and laboratory work usually required under research contracts undoubtedly furnish a fund of information from which theoretical generalizations, important from a purely scientific point of view, can be derived.

The slow increase in the number of doctors of geographical sciences at the universities is also a cause for serious concern. (Editor's note: The Soviet doctorate is a higher degree than the American Ph. D. and is more nearly comparable to the British D. Sc. or the German Habilitation.) So few new doctors have been added recently that they barely make up for natural losses. We said at the beginning of this paper that out of 160 doctors of geographical sciences in the USSR (as of December 1, 1958) about half were in higher education, chiefly universities. But if we bear in mind that 30 doctors are at Moscow and 10 at Leningrad, the other universities offering geography have an average of one or two doctors. Some universities, for example, Kiev and Tashkent, have three or four doctors, but there are many with no doctor on their staffs. The situation is especially serious in economic geography. There are only 15 doctors in that field, of whom 12 are at Moscow and Leningrad. The limited number of doctors is one of the reasons holding up the establishment of geography institutes within the system of the Academy of Sciences at Kiev and Tashkent.

Doctoral dissertations in geography lately have been defended more often by staff members of research institutes than by university personnel. The latter carry a heavy teaching load. That load is often aggravated by administrative or public volunteer duties. The docent at the university level represents after all the basic element of the teaching staff. It is not an easy matter to release the docent of a provincial university for one or two years to enable him to complete his doctoral dissertation. It seems to us that the time has come for the republic ministries and committees of higher and secondary specialized education to formulate effective programs to promote doctorates in those fields in which the increase has been excessively slow. And if a given docent is released from teaching, an additional position should be created on the staff to assure a smooth teaching process and not to overload other members of the department. It would be gratifying if the geography section (headed by Prof. Yu. G. Saushkin) of the Scientific-Technical Council of the Ministry of Higher and Secondary Specialized Education USSR would carefully study the present state, growth and training of young doctors in geography at the universities, make appropriate recommendations to the leadership of the Ministry and assure their implementation.

Scientific contacts both within the country and with foreign colleagues play an important part in the scientific and methodological growth of geographers, in broadening their geographic outlook, and in adding to their experience of geography research and teaching. However, Soviet geographers lag far behind their foreign colleagues in foreign travel, and in their writings are forced to substitute bookish descriptions for lively, personal impressions of geographic landscapes. That is another matter to which the attention of the Ministry should be directed.

On the other hand, the teaching staffs of universities should themselves demonstrate greater persistence and organization in raising their own scientific level and promoting the training of doctors, again by using the advantages of the research-contract system. The addition of personnel to the staff under the contract system enables departments to maneuver more freely with their teaching and research directives while the fund of information collected through field work and laboratory research can serve as source for doctoral dissertations.

The fulfillment of the ambitious aims of the seven-year plan and of the 15-year long-range plan to build the material and spiritual basis of communism in the Soviet Union will undoubtedly draw the rich natural resources of the country into more intensive economic circulation. Life itself will tend to raise the role and importance of geographic science. And geographers should make every effort to render maximum assistance in the development and distribution of productive forces. One of the key tasks of university geography is to train and educate a new generation of qualified geographers worthy of the era of the construction of communism in the Soviet Union.

FIFTY VOLUMES OF THE SERIAL VOPROSY GEOGRAFII

By Yu. G. Saushkin

(From Voprosy Geografii, No. 50, 1960, pp. 3-12)

(Abstract: Professor Saushkin, a member of the editorial board of Voprosy Geografii since its inception, reviews the first 50 volumes of the serial and its program of publication. Many volumes of Voprosy Geografii have contained inter-disciplinary articles focused on specific geographic problems. This integrated approach to geography has often aroused controversy. Seven major fields of research of Soviet geography are outlined for the period 1960-80.)

The State Publishing House for Geographical Literature was established in the Soviet Union in the autumn of 1945. In drafting its first publication program N. N. Baranskiy proposed the inclusion of serial volumes of scholarly articles on geography. It was then decided to call these serial volumes Voprosy Geografii (Problems of Geography). The 70th birthday of L. S. Berg was approaching and it was desired to dedicate the first volume of the new serial to that remarkable scholar. The publishers requested contributions from such leading geographers as I. S. Shchukin, A. S. Barkov, A. A. Polovinkin and B. P. Alisov, as well as from "middle-generation" geographers, such as K. K. Markov and I. P. Gerasimov. But more than anything else, the publishers hoped to have a contribution from Berg himself, whom they had informed of the plan to publish the new serial and asked for support. Berg, who was always responsive, agreed to write an article. His first letter to the editorial board of Voprosy Geografii is reprinted here in full:

December 20, 1945

"... I received your telegram. My articles on fossil loess and on precipitation zre not yet ready, but at the beginning of January I will send you instead for Voprosy Geografii an article titled "On an assumed link between the great glaciations and mountain-building processes." This is a paper which I read in expanded form at the Teachers Institute. The article, which is one printer's sheet in length, is finished and only has to be retyped, which will be done in the next few days.

"The following idea came to mind. Would it not be better to call the new serial Zemlevedeniye (Earth Science) instead of Voprosy Geografii? It would be a mark of respect for the great Russian geographer D. N. Anuchin. It seems to me that aside from the State Publishing House no one would have any legal rights to that title."

Actually the Moscow Society of the Students of Nature had a priority claim to that title, and its publishing house soon thereafter resumed publication of volumes of articles titled Zemlevedeniye.

On March 7, 1946 an organizational meeting of the Moscow members of the Geographical Society USSR took place in the club room of Moscow University to establish a Moscow branch of the Society. The new serial Voprosy Geografii was to become the publication of the new branch. The serial's first editorial board included three geographers: N. N. Baranskiy, K. K. Markov and Yu. G. Saushkin. The post of responsible secretary of the serial was given to M. A. Tensin, a young staff member of the Geographical Publishing House, who had been graduated from the Teachers Institute named for V. I. Lenin a few days before the outbreak of war and who had returned from the front just when Voprosy Geografii was being established. The first volume was sent to the printers on March 23, 1946.

The publication of Volume 1 of Voprosy Geografii was favorably received by the Soviet geographic community. Berg also reacted warmly in the following following letter:

November 10, 1946

"... Yesterday I received No. 1 of Voprosy Geografii. My heartiest thanks to the Geographical Publishing House and to the Moscow Branch of the Geographical Society for the honor shown by the dedication of the volume to me. I will always treasure the memory of this testimony of the good-will of my friends toward me...

"As one of the co-authors of No. 1 of Voprosy Geografii it is of course difficult for me to give an objective appraisal of the contents of the first issue. But it seems to be that the volume is interesting and that the articles are of current scholarly interest, and that some touch on problems of practical volume; the latter include the articles by... Polovinkin, Alisov, Appolov, Samoylov, Nikol'skiy. I was very pleased to see that No. 1 also recalled the memory of the remarkable geographer D. N. Anuchin..."

The first three volumes of the serial were not each devoted specially to a given branch of geography, but their dedication to leading Soviet geographers determined the nature of their contents: the first volume, dedicated to Berg, included mainly articles in physical geography; the second, dedicated to Baranskiy on his 65th birthday, dealt with economic geography; and the third, dedicated to Ya. S. Edel'shteyn on the 50th anniversary of his scholarly career, was devoted to geomorphology.

Starting with the fourth volume, each issue of Voprosy Geografii was devoted to a specific geographic topic. An editorial foreword stated: "Each volume will be devoted to a certain geographic problem or to a survey of the basic fields of geographic science, general geographic surveys being treated as far as possible in each volume."

Out of the 50 volumes of Voprosy Geografii, 14 were devoted to physical geography (physical geography proper and landscape science as well as individual physical-geographic problems); 14 to economic geography (including the geography of population and urban geography); 5 to geomorphology (with glaciology), 4 to cartography, 2 to hydrology and climatology, 4 to the history of geography and historical geography, 5 to geography as a whole and the teaching of geography in higher and middle schools, and 2 volumes to geographic description of the central regions of Russia.

In the first review of Voprosy Geografii, printed in Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva (No. 5, 1948), S. V. Kalesnik, while highly praising the new geographic serial (*), expressed doubt regarding the advisability of the topical organization of the volumes: "The principal objection to the topical principle of selection for these geographic volumes of articles is that it maintains objectively the separateness of the various geographic disciplines instead of promoting their unity. It is true that in the given case we are dealing with a purely technical arrangement for the publication of papers and not with the expression of a trend in principle. But geographers of various disciplines must get used to synthesis and to the unity of all available methods, including plans of publication of geographic journals and volumes of articles."

((*) S. V. Kalesnik also wrote: "In summarizing our review, we should emphasize that Voprosy Geografii makes an important, systematic contribution to Soviet geographic literature. In a relatively short time the volumes of Voprosy Geografii have won high scholarly authority and the following of a rather large readership. This is due both to the rich contents of the volumes and to the circumstance that they reflect invariably the newest and current problems of concern to geographic science.")

Kalesnik was quite right in his striving for geographic synthesis, and his feelings were shared entirely by the editorial board of Voprosy Geografii. However, the editors also had to take account of the existence of specialized departments and commissions of the Moscow Branch of the Geographical Society, each with a group of prominent specialists in a given branch of geography -- cartographers, geomorphologists etc. -- who asked for volumes devoted to their own field.

The solution was to publish as large a number as possible of such problem volumes, whose topics would be covered by geographers from various specialties.

The first such "integrated" volume of Voprosy Geografii was No. 9, titled "Lomonosov Lectures" (of the Geography Faculty of Moscow University) and dedicated to the 25th anniversary of the death of D. N. Anuchin, "great Russian geographer and founder of the Russian school of university geography." The "Lomonosov lectures" of 1948 had great methodological importance by focusing attention on many fundamental problems of the development of Soviet geography. The volume sharply criticized in particular the views of Academician A. A. Grigor'yev for the first time in Soviet scholarly literature. Some critical comments were also made with regard to certain statements in the works of Academician L. S. Berg.

Berg replied to No. 9 of Voprosy Geografii with the interesting letter cited below:

January 13, 1949

"...The ninth volume of Voprosy Geografii contains a great deal of interesting material. I have no objections in principle against what is said in that volume, but I do not quite agree with N. A. Solntsev's criticism of my definition of landscape (aspect) in his article on Pages 68-69. I wrote that the character of agricultural activity is to a certain extent related to the characteristics of the zone in which that activity takes place. Solntsev questions that statement by pointing to the northward movement of crops and so forth. But can it really be said that agriculture is related in no way to geographic zones? Why then are there zonal agricultural experiment stations? Why then do people raise cotton and grapes in the arid zones of the south rather than in the tundra? Why then are reindeer raised in the tundra and camels in the desert and not the other way around? Of course, grapes can also be grown on Novaya Zemlya, but how much would it cost? It seems to me that Solntsev's point of view is an obvious exaggeration, out of step with the usual concepts of geographers on this question. As far as concerns my unfortunate expression of the "harmoniousness" of landscape, I wanted to stress with it that all elements of the landscape (aspect) are closely linked to one another. I agree that this term is somewhat unfortunate; it would be better to speak of interrelationships. Of course, I placed no other meaning on the term "harmoniousness" and, in fact, could not have placed any other meaning in the context.

"Regarding the remarks by Yu. Z. Brotskiy on p. 147 of the volume, I should like to note that I do not deny the importance for a geographer to be aware of processes, but I feel that a geographer must rely on other specialized sciences for data on processes. If a geographer is expected to study the physical processes taking place on the surface of the earth, why then should he be released from the study of physiological processes, processes that are just as important for the geographer since they take place in the plant and animal world (including the world of man)? For some reason it is felt that the geographer must be familiar with the processes of relief formation, but not with the processes of nutrition, breathing and reproduction of, say, trees. In the

latter field, if necessary, he may take ready-made material from studies on plant physiology. I can see no consistency in such a view of geography.

"But these things are secondary; in general the ninth volume makes a favorable impression."

In the wake of the ninth volume, topical problem volumes began to appear with increasing frequency, containing articles both by physical geographers and by economic geographers, cartographers, historical geographers, geomorphologists and so forth.

Following are some titles of volumes that go far beyond the standard names of departments of the Society: The transformation of the steppe and forest-steppe (Volume 13), landscape science (16), higher geographic education (18 and 25), the transformation of the nature and the economy of the USSR (19), the nature of the steppe and the forest-steppe and its transformation (23), production types of collective farms (30), the Central Chernozem oblasts (32), geography in the middle and higher schools (37), urban geography (38), physical-geographic regionalization (39), qualitative inventory and evaluation of lands (43), geography abroad (44), geography of urban and rural settlement (45), economic regionalization of the USSR(47) and others.

In the future the predominant part of the volumes of Voprosy Geografii should continue to be clearly defined in aim, concerned with specific problems, have individual titles and uncover the essence of the problem. This is required by the very life and practice of the Soviet Union's great construction effort. If a volume is named simply for one of the departments of the Society (physical geography, economic geography, cartography, geomorphology and so forth), it means that it can contain any article falling within that branch of geography. On the other hand, the formulation of a problem in the title of the volume requires the editors to select material specifically designed to help arrive at a solution of that problem.

As repeatedly noted in reviews, Voprosy Geografii has printed many important methodological studies that provoked discussion. Among the more significant problem articles were several by Baranskiy, N. N. Kolosovskiy's "The territorial-production combination (complex) in Soviet economic geography" (Vol. 6) and "Scientific problems in geography" (Vol. 37); S. D. Muraveyskiy's "Role of geographic factors in the formation of geographic complexes" (Vol. 9); B. B. Polynov's "The doctrine of landscapes" (Vol. 33); V. A. Anuchin's "On the essence of the geographic environment and the manifestation of indeterminism in Soviet geography" (Vol. 41), and others.

The polemic around some of these articles became so acute that Voprosy Geografii had to print replies to some of the critics. In Vol. 14 Baranskiy printed "A survey of reviews of Voprosy Geografii" and in Vol. 21 four authors (K. Markov, Yu. Saushkin, N. Solntsev and A. Solov'yev) published a lengthy "Reply to reviewers." In the first case Baranskiy replied ably to

critics of Kolosovskiy's article on territorial-production complexes. The article, incidentally, was republished in 1958 in a posthumous edition of Kolosovskiy's book Osnovy ekonomicheskogo rayonirovaniya (Principles of Economic Regionalization), with an introduction by Academician G. M. Krzhizhanovskiy; the article is playing an increasingly important role in geography and is assuming growing practical significance.

"Reply to reviewers" was an answer to accusations levied against Vol.9 of Voprosy Geografii, especially against Muraveyskiy's article. In attacking Vol. 9, the reviewers sought at the same time to defend A. A. Grigor'yev's theory of a "physical-geographic process" and an "economic-geographic process." Time has shown that Voprosy Geografii proved correct in that field of geography.

The sharpness of some important scholarly articles and the controversial character of some statements became characteristic of many volumes of Voprosy Geografii, reflecting, in particular, the many scientific discussions that had developed since the founding of the Moscow Branch of the Geographical Society USSR.

Voprosy Geografii could not, of course, be allowed to become a debating society in print. Its 50 volumes contain a huge amount of generalized factual data, successful examples of geographic research of various types and proposals for scientific research dealing with the prospects of the development of various branches of geography and of geography as a whole. Examples in the field of urban geography are the program article by Baranskiy "On the economic-geographic study of cities" (Vol. 2); excellent models of specific economic-geographic urban studies -- I. A. Vitver's "Paris", I. M. Mayergoyz' "Geographic situation of Stalingrad" (Vol. 2) and "Vienna" (Vol. 8), and broad generalizations of factual data: O. A. Konstantinov's "On the classification of cities in economic geography" (Vol. 41), P. I. Dubrovin's "Urban agglomerations" (Vol. 45), V. G. Davidovich's "On the typology of settlement in groups of cities and towns of the USSR" (Vol. 38), "On the development of the network of cities of the USSR in the last 40 years" (Vol. 45) and so forth. Similar articles were published in all major fields of Soviet geography.

There was a great deal of sense in dedicating some volumes of Voprosy Geografii to leading Soviet geographers in connection with various events (on the occasion of an anniversary or in memory of a dead scholar). These volumes usually contained contributions by students and followers of the given scholar and thus presented articles of related scientific content, giving the volumes a certain unity and depicting the ideas of various schools of thought. Out of the 50 volumes of Voprosy Geografii, 19 have been dedicated to Soviet geographers: L. S. Berg (Vols. 1 and 24), N. N. Baranskiy (Vol. 2, 27 and 41), Ya. S. Edel'shteyn (Vol. 3), D. N. Anuchin (Vol.9), A. A. Grigor'yev (Vol. 15), V. N. Sukachev (Vol. 23), S. D. Muraveyskiy (Vol. 26), I. A. Vitver (Vol. 29), B. B. Polynov (Vol. 33), S. V. Bakhrushin (Vol. 20), A. S. Barkov (Vol. 40), I. S. Shchukin (Vol. 39),

V. A. Obruchev (Vol. 35), Yu. M. Shokal'skiy (Vol. 42), R. M. Kabo (Vol. 45), N. N. Kolosovskiy (Vol. 47).

The 50 volumes of Voprosy Geografii represent a whole geographical encyclopedia of more than 800 printer's sheets in volume, written by Soviet scholars. It contains contributions by about 500 authors. It should be noted that the pages of Voprosy Geografii were open not only to recognized scholars, but to young geographers and students. Many of the young contributors whose first papers were published in Voprosy Geografii have since become prominent geographers.

Several volumes also contain articles by foreign scholars: S. Leszczycki, K. Dziewonski, Sun Ching-chih, J. Dobersky, E. Zalai, A. Beshkov and L. Dinev, Angel Bassols Batalla, Huang Ping-wei, S. Cigmit, Chu Ko-chen, Yang Chin-shih, Chang Wen-tang, S. Herbst and F. Roubik.

Voprosy Geografii became quite rapidly well known not only in the Soviet Union but also abroad. Foreign geographic journals are more and more frequently printing reviews of groups of volumes of the serial or reviews of individual volumes; individual articles are being reprinted abroad, and volumes of articles reprinted from Voprosy Geografii have started to appear.

It is unfortunately very difficult to compile a complete bibliography of reviews of Voprosy Geografii printed in the foreign literature. It is even more difficult to list all the translations and reprints of articles abroad. Only a few examples will therefore be cited here. (The bibliographical material was collected with the assistance of Ye. A. Opochinskaya, N. L. Osipova and Yu. V. Ilinich.)

Polish geographic journals, for example, have been printing systematic reviews of groups of volumes of Voprosy Geografii or of individual volumes. The journal Przeglad Geograficzny printed reviews of Vols. 1-20 (Vol. XXIII, 1950/51, pp. 165-70) and Vols. 21-36 (Vol. XXV, 1956, No. 2, pp. 419-23), and reviews of individual volumes -- No. 30 (Vol. XXVI, 1954, No. 4, pp. 220-24), No. 38 (Vol. XXVIII, 1958, No. 4, pp. 811-13), and No. 39 (Vol. XXX, 1959, No. 1, pp. 142-49). In addition there was a review of No. 31 in the journal Czasopismo Geograficzne, Vol. XXVII, No. 4, pp. 378-89.

Reviews of individual volumes of Voprosy Geografii (for example, No. 38 on urban geography) were published in geographic journals of France and Japan.

Before me is a large volume in Chinese published in 1959. It is a volume of articles on the geography of population and urban geography translated from Vols. 5, 14 and 38 of Voprosy Geografii. The 284-page book contains papers by R. M. Kabo, N. I. Lyalikov, L. A. Ustinova, Yu. G. Saushkin, S. A. Kovalev, V. G. Davidovich, I. M. Mayergoyz, O. A. Konstantinov, V. V. Pokshishevskiy, K. Dziewonski and others.

Soon after the appearance of the first volumes of Voprosy Geografii Prof. Chauncy D. Harris of the University of Chicago pointed out the scientific importance of the new serial in a clever dialogue about Soviet geographical literature printed in Geographical Review (D. C. Harris, "Geographical Literature on the Soviet Union, a Discussion," Geographical Review, Vol. 42 (1952), pp. 615-27). When Harris was asked at the time of his lecture in the Institute of Geography of the Academy of Sciences USSR (during his 1957 visit to the USSR) which studies by Soviet geographers he regarded most highly, he replied simply, "Voprosy Geografii."

David Hooson wrote in an article on Soviet geography, printed in the Annals of the Association of American Geographers: "Much of the credit for such positive changes in the integration-climate of Soviet geography as have occurred over the last decade should go to the periodical Questions of Geography Voprosy Geografii which by precept and example has seemed more than any other vehicle to bring all geographers together effectively and lay the foundations for unity." (David J. M. Hooson, "Some recent developments in the content and theory of Soviet geography," Annals of the Association of American Geographers, Vol. 49, No. 1, March 1959, pp. 79-80).

The great renown that Voprosy Geografii has acquired among geographic serials obligates it in many ways. Its volumes must deal, to an even greater extent than before, with problems of current interest, with acute theoretical questions, reflect the newest achievements of Soviet geography, and be tied in even more closely with life.

Much remains to be desired as far as the tie-in between geography and life is concerned; this is reflected, in particular, in the content and especially in the circulation of Voprosy Geografii.

An editorial article in the journal Geografiya v Shkole (Geography in the Schools) quite correctly noted the "academism" of scholarly geographic journals and said: "... even Voprosy Geografii (published by the Moscow Branch of the Geographical Society USSR), which is known throughout the world and whose presentation of acute and practical problems of geographic science has made it an authority among geographers, nevertheless has a relatively limited circulation. This shows that scholarly geographic journals and volumes of articles are mainly designed for professional geographers and circulate to a very limited extent among teachers, engineers, agronomists, industrial economists and other mass "consumers" of the results of geographic research. Scientific research for the sake of its own satisfaction will not advance science very far; on the other hand, broad popular reaction to scientific achievements provides an important stimulus. It is quite obvious that geography still lacks mass appeal, and this should be a matter for serious concern" ("Geography teachers and geographic science on the eve of the First Russian Teachers Congress," Geografiya v Shkole, 1959, No. 6, p. 8).

The great construction effort in the Soviet Union at the present time needs more than ever integrated geographic solutions of important national economic problems. It is precisely in the integrated approach to area research that we find the "soul" of Soviet geography, and Voprosy Geografii should proceed further along that line, combining the efforts of specialized geographers in integrated research.

As far as the content of future volumes of Voprosy Geografii is concerned, it should be closely related to the general plan of development of the economy, science and culture of the USSR. In the period 1960-80 Soviet geographers intend to concentrate on the following problems:

1. Physical-geographic and economic-geographic regionalization (of the USSR and foreign countries). The geographical division of labor among countries and regions. Inter-regional economic relations in the USSR.

2. Integrated geographic mapping, including the compilation of national and oblast (republic) atlases.

3. Integrated geographic study of industrial nodes and cities (for purposes of regional planning, the designing of new cities and the rebuilding of existing cities).

4. Large-scale physical-geographic regionalization with an evaluation of natural conditions for agricultural purposes, and large-scale agricultural regionalization.

5. The development of the geographic environment as a whole and its individual areal complexes, both in the prehistoric period and in the last millenia, centuries, decades, with forecasts of changes in the near and long-range future.

6. Inventory, mapping and economic evaluation of areal complexes of renewable natural resources with compilation of an over-all cadaster.

7. Development of the geographic culture of the Soviet people through the dissemination of geographic monographs and scientific-popular literature (about countries, regions, cities and other geographic features), textbooks for middle and higher schools, general-purpose geographic maps and atlases, and studies on the history of geographical discoveries and the history of geography.

The solution of the major problems facing geography will make it a science of great importance, advance it among other sciences, raise the authority of geography among the people, and demonstrate its important role in the economy and culture of the country.

RECENT LATERITES AND LATERITIC SOILS

By I. P. Gerasimov

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1961, No. 2, pp. 3-12)

(Abstract: The author notes that the large literature on laterites and lateritic soils is concerned mainly with regional description and the physical-chemical processes of soil formation. No attempt is made to analyze the geographical-genetic conditions under which such soils are formed. The author goes on to develop a geographical-genetic classification of laterites and lateritic soils based on the thermal and humidity conditions of soil formation and the petrography of the parent material.)

Laterites and lateritic soils are terms designating surface formations found in tropical and subtropical areas and possessing many distinct external features and internal properties. (In the specialized literature the term "laterite" is used in two senses: a narrower and a wider. In the narrow sense, the term "laterite" is used to designate ferruginous surface crusts or thick, compact ferruginous horizons in tropical soils. In the broad sense the term "laterite" is used to designate the type of soils predominating in the tropics. The broader meaning is the one used in the present paper; such use agrees with the classical tradition in the Russian soils literature, for example, the work of V. V. Dokuchayev, K. D. Glinka and others.) In contrast to the soils of the temperate latitudes, laterites and lateritic formations are brightly colored, usually red or yellow with intermediate shadings. In the geographical and geological literature such formations are therefore often called red soils and yellow soils. Another characteristic of laterites is their great thickness, which may reach several tens of meters. In that connection the question often arises to which category of surface formations laterites should be assigned: geological formations, soils formations or mixed soils-geological formations.

Laterites and lateritic soils have a distinctive structure that complicates the answer to the above-stated question. The lower horizons usually preserve the texture of the parent material (for example, granite or porphyry) although they have nothing in common with that rock in physical properties, mineralogical and chemical composition. Laterites and lateritic soils usually have a friable, often plastic texture; they can therefore be called "decayed rock", which, while preserving the texture of "rock", can be cut with a table knife without any obstacle, just like butter. A characteristic external feature of laterites and lateritic soils is the constant presence of many iron-manganese-silica concretions of various densities and sizes, ranging from pisolitic grains to continuous, compact horizons (crusts and intercalated layers one meter thick or more).

Laterites and lateritic soils have distinctive mineralogical and chemical compositions. Their mineral mass is deeply weathered and consists mainly

of residual quartz, amorphous free silica, hydroxides of iron and aluminum, and various secondary clay minerals (kaolinite, montmorillonite). Of all the surface formations, laterites and lateritic soils apparently show the highest degree of chemical decay and transformation of the primary minerals of igneous and metamorphic rocks through weathering processes. The mineral mass of laterites therefore exhibits many remarkable physical and chemical properties. Among them are the ampholytoid properties of their colloids, i.e., the capacity to absorb in substantial amounts not so much cations as anions.

It has long been established that the chemical composition of laterites and lateritic soils is marked by a relatively higher content of iron and aluminum compounds compared with the parent rock. This indicates the relatively lesser mobility of these compounds in laterites compared with all other compounds. This characteristic of the chemical composition of laterites appears to be quite constant, and holds true as a general tendency even for major variations in mineralogical and chemical composition.

In view of their wide distribution in tropical and subtropical areas, laterites and lateritic soils are important in agriculture and forestry and have therefore long been the object of study of the agronomic and biological sciences.

However, recent laterites and lateritic soils are also an interesting object of study for the geological and geographic sciences. In some tropical countries, recent laterites are used as iron ore. The wide distribution of older lateritic formations, which often constitute a valuable mineral raw material and an important paleogeographic indicator, makes them an even more important object of geological study. Systematic study of the origin of recent laterites and lateritic soils is therefore of direct interest to geology by throwing light on the origin of older forms. It can therefore be said that recent laterites and lateritic soils are worthy of study from the geological, geographical and biological points of view. However, the fullest synthesis of all these approaches and research aims can be achieved by studying these phenomena from the point of view of soil science.

Russian scholars are well known to have played a leading role in the development of soil science. But the problem of the origin, classification and geography of lateritic soils has been relatively neglected by the Russians. The principal reason has obviously been the limited distribution of such soils in Russia, making it impossible to apply the fruitful principles and methods of Dokuchayev's soil science to the study of lateritic soils.

It is important to note, however, that V. V. Dokuchayev and A. N. Krasnov, noted Russian geobotanist and founder of the Batumi Botanical Garden, defined the red and yellow soils characteristic of the Batumi area as typical recent lateritic formations. It is true that the definition was not accompanied by thorough study of these soils. The soils were studied later

by P. A. Zemyatchenskiy, K. D. Glinka and A. N. Ostryakov, mainly from the mineralogical and chemical points of view. In the course of these investigations, which showed the profound difference between the red and yellow soils and previously known soils, it was suggested that these red and yellow soils were no longer being formed on the shores of the Black Sea under present-day climatic conditions and that they represented therefore a residual soil of Tertiary times. That point of view was developed in the early writings of B. B. Polynov, who also regarded the red and yellow soils of Abkhazia and Adzharia as typical lateritic formations.

In their later work, however, Polynov and his associates reached entirely different conclusions on the basis of more systematic geographic and laboratory research.

They found that the weathered parent material of Abkhazia's red soils, which had been subject to erosion in a few places, exhibited clear evidence of recent laterization (specifically, a deep decay of the mineral mass with formation of free oxides of iron and aluminum); the soils formed on that mantle rock showed evidence of the acid soil-forming process similar to, but not identical with, the process of podzolization.

The work of Soviet soil scientists (for example, M. N. Sabashvilli, 1954) has, in general, confirmed Polynov's views and characterizes the red and yellow soils of western Transcaucasia as typical soils of the humid subtropics.

It is important to note that the soils of other subtropical areas of the USSR, cooler and much drier than the Black Sea coast, exhibit virtually no evidence of the laterization process. Examples of such soils are the brown soils of dry woods and shrubland, first described in central Transcaucasia by S. A. Zakharov, and on the south coast of the Crimea by B. B. Polynov, L. I. Prasolov and I. N. Antipov-Karatayev, i.e., in semi-humid subtropical areas with a pronounced dry season. These soils exhibit a neutral or weakly acid reaction, incomplete leaching of water-soluble salts, and a strongly developed process of clay formation, i.e., the accumulation in the soil of relatively stable secondary clay-like materials. These soils thus differ sharply in all their basic properties from the above-mentioned red and yellow soils and can certainly not be regarded as lateritic.

It is thus evident that in the USSR only the surface formations of the humid subtropics exhibit signs of recent laterization (i.e., deep decay of the mineral mass with formation of free silica and aluminum and iron oxides within the soil and relatively heavy accumulation of the latter compounds). There is no evidence of laterization in the soils of drier areas so that the northern boundary of recent lateritic formations in the USSR lies within the subtropics. As the climate becomes drier and a lengthy dry season appears, the red and yellow lateritic soils are replaced by the brown soils of the semi-arid subtropics. As the climate becomes cooler -- as one moves northward within the humid climate zone -- the red and yellow soils are replaced

by yellow-brown forest soils (also known as podzolized yellow soils), which are transitional to the gray-brown forest soils of the temperate zone. The latter, generally acid but typically boreal soils, show no evidence of laterization, while the yellow-brown soils still exhibit it to a slight degree. Such a transition of characteristic soils can be observed along the Black Sea coast of the Caucasus as one moves from Batumi (red soils) through Sukhumi-Sochi (yellow-brown soils) to Tuapse (brown forest soils), or from the subtropical coast into the forested mountains.

The foreign literature is much richer than the Soviet in studies dealing with recent laterites and lateritic soils. That is to be expected, of course, in view of the fact that these soils are widespread in all subtropical and tropical countries. The foreign studies contain a vast body of valuable factual data with descriptions of the profiles of laterites and lateritic soils and the results of laboratory study of the composition and properties of the soils. That body of material is being constantly expanded as new research is being done in tropical countries. A good illustration of that steady and rapid growth is found in the proceedings of the Fifth International Congress of Soil Science, which met in 1954 in Leopoldville. The fourth volume of the proceedings of the congress contains the papers from the section on the genesis, classification and mapping of soils. Most of the 70 papers deal with the tropical soils of Africa, Australia and other areas (Actes et comptes rendus..., 1954).

There is one characteristic aspect of this rich foreign literature on recent laterites and lateritic soils. It is the heavy dominance of descriptive regional studies and reports on laboratory research and the relatively small number of generalizations with a genetic content. For example, the proceedings of the soils congress contain virtually no papers of a theoretical character. Even the congress colloquium on problems of classification of tropical soils, in which prominent foreign soil scientists took part, yielded no great positive results. The participants noted the wide divergence of views on the subject of the colloquium and decided to work further on the problem on the basis of international collaboration among scholars.

It is difficult to find a satisfactory explanation for that situation. It may be found in the fact that, for certain historical reasons, students of lateritic soils in tropical countries have not made use, at least not to a sufficient degree, of the principles and methods of geographic-genetic soil science that have yielded such important theoretical results in the work of the Dokuchayev school on the soils of the temperate zone. Foreign soil scientists, especially those working in tropical regions, have thus far used mainly lithological soil-study methods inherited from the previous agro-geological approach, in which lateritic soil samples and profiles were studied (admittedly in great mineralogical and chemical detail) mainly in laboratories with no relation to the conditions of formation of these soils in nature and without proper consideration of their wide geographic diversity.

It seems to me that even a cursory examination of the best known foreign

theorectical studies on the genesis of recent laterites confirms the view expressed above.

Take as an example the work by the German soil scientist H. Harrassowitz titled "Laterit" (Harrassowitz, 1926). That study generalizes a large body of factual data on recent laterites and lateritic soils and offers an original explanation of many specific features of those soils. The author concentrates on an explanation of the mineralogical and chemical character of the laterization process (deep decay of the primary minerals and secondary clays) and on the conditions under which the principal components, the free silica and the aluminum and iron hydroxides, migrate within the soil.

Harrassowitz' views on laterite and its formation are based mainly on experimental laboratory work and are reflected in his concept that the typical laterite soil profile was developed under the influence of the weathering process and consists of various zones distinguished by either eluviation or illuviation of the various chemical components of the laterite (mainly the free silica, the hydroxides of aluminum and iron and the manganese oxides). Harrassowitz' fundamental study thus covers many important questions of the mineralogy and geochemistry of laterites, analyzes the physical-chemical character of the laterization process ("allitization" according to Harrassowity) and suggests several new laboratory study methods.

On the other hand, his study contains no systematic survey of recent lateritic formations found in various parts of the earth and fails to show the genetic interrelationships between the character of those formations and their natural environment. Instead of offering a broad concept of recent laterization on the earth's surface in its diversified concrete manifestation, the study presents a more or less abstract scheme of a complicated physical-chemical process under which the universal profile of a typical laterite is formed. We know, however, that the natural forms of laterization are extremely diversified and that even their most common and related features are not covered by the idealized scheme worked out by Harrassowitz. That is why his monograph, which played an important positive role at one time and is still valuable from the methodological point of view for experimental laboratory study of laterites, can no longer serve as the theoretical basis for present-day research on tropical soils. This is quite evident, for example, from the proceedings of the Fifth International Congress of Soil Science, in which Harrassowitz' work is seldom mentioned.

Similar comments can be made with regard to a much later work by two British soil scientists, I. Prescott and K. Pendleton, published in 1952 under the title Laterite and Lateritic Soils. That monograph utilizes the term "laterite" in its narrow sense, designating crusts and compact horizons (both old and recent) in tropical soils (mainly in Australia) enriched with iron and aluminum oxides. The study contains a large number of valuable observations on the morphology, structure and chemistry of such formations and is of definite interest in explaining the physical-chemical conditions of laterite formation. However, the entire problem treated in this monograph can

in no way be identified with the problem of recent laterite formation in the broader sense. Moreover, by limiting the object of study to the concretion bodies in laterites, the authors artificially isolate that phenomenon from all other phenomena in laterization processes, which, of course, also does not contribute to a breadth of approach. In short, here again we find no full treatment of the problem of laterite formation, especially not from the geographic and genetic points of view.

A different kind of assessment must be given to another important monograph on recent laterites, Osnovy ucheniya o pochvakh subtropicheskikh i tropicheskikh stran (Principles of Study of the Soils of Subtropical and Tropical Countries) by P. Fageler (1935). This book was translated into Russian soon after its publication and was highly praised in a foreword to the Soviet edition.

Fageler's views on the process of soil formation in subtropical and tropical countries differ substantially from those of Harrassowitz. According to Fageler, the process of allitization, i.e., the deep decay of the mineral part of the soil with eluviation of the free silica and accumulation of alumina and iron oxides, takes place only in a neutral and alkaline medium, while the process of siallitization, i.e., eluviation of bases and of iron and aluminum oxides and accumulation of residual silica, takes place in an acid medium. According to Fageler, both processes can take place in tropical and subtropical regions, producing mixed siallitic-allitic or allitic-siallitic formations. In keeping with that point of view, Fageler holds that the most typical allites (red soils or laterites) must be formed in semi-humid tropical and subtropical regions with variable humidity (for example, savannas), where allitic material (consisting mainly of the colloids of aluminum and iron hydroxides) accumulates in the wet season and is then transformed and fixed in a stable form in the dry season. With regard to humid regions, i.e., constantly humid tropical and subtropical areas, there such allitic material (i.e., laterites) must be formed, according to Fageler, only in the first stage of soil development until the soils acquire a stable acid reaction. At a later stage, particularly under the cover of a dense tropical forest, which supplies the soil with large amounts of acid humus materials, the acidity of the soil increases and the formation of allitic soils is replaced by the formation of siallitic soils (especially in the upper horizons). Fageler says, "Under dense forest the formation of the soil profile is similar to a tropical process of podzolization."

Without going deeply into an analysis of Fageler's ideas, it must be noted that he tries to distinguish, however schematically, various forms in which the laterization process manifests itself under the different natural conditions of tropical regions. However the step taken by Fageler in that direction was still a very small one and was dictated not so much by direct observations in nature as by deductions of a physical-chemical character. Besides, in noting the possibility that both laterization and podzolization processes can be associated in the soils of the tropical rain forest, Fageler simply confirmed observations made by Soviet soil scientists

in the humid subtropics (see above). In suggesting the possibility that allitization (i .e., accumulation of iron and aluminum oxides) can develop In the soils of variably humid tropical regions (under savannas), Fageler also generalized many empirical observations made by others in dry tropical regions of Africa, Australia and South America. On the whole, Fageler offered a somewhat broader concept (in the geographic-genetic sense) than his predecessors. However, that concept still treated too schematically the complex problem of recent laterite formation; it was too heavily subordinated to a preconceived physical-chemical approach and, because of that, it did not cover the tremendous diversity of natural processes.

A significant event in the recent literature on lateritic soils was the appearance of the monograph Tropical Soils by E. Mohr and F. Van Baren, published in 1954-59 by the Tropical Institute in Amsterdam. It was based on the authors' own observations of lateritic and other tropical soils in New Zealand; these observations were supplemented by comparisons with soils of other tropical regions.

The authors of this monograph made a major step forward in the study of the genesis of lateritic formations. Together with more typical laterites, they also describe other genetically related forms, including dark-colored tropical clays formed on basic parent material (margolithic soils). Unfortunately even this fundamental study did not adequately discuss the diversified geographic-genetic variations of lateritic soils characteristic of various combinations of soil-forming conditions.

In recent years the present author had occasion to visit several tropical and subtropical countries (Gerasimov, 1949; 1953; 1958a, b; 1959a,b) and to examine directly a series of profiles of recent lateritic formations. Among the many profiles examined in Senegal, Algeria, Tunisia, India, Japan, southern China, and Brazil, several samples were selected for laboratory study. The latter has taken a lot of time and effort and is still incomplete. However, a comparison of the various field observations, supplemented by the available literature on these soils and some of the author's own analytical material, makes it possible even now to formulate some of the main conclusions obtained as a result of those trips.

1. By recent laterite formation we understand the phenomenon of deep mechanical and chemical decay and transformation of igneous and sedimentary rocks under the influence of weathering and soil formation . The laterization process gives rise to distinctive soil-geological formations of bright coloring, great thickness, and distinctive composition and texture. These formations are characterized by the deep decay of almost all primary minerals and of a large part of the secondary clay minerals, the accumulation of residual quartz, amorphous silica, alumina and iron oxides subject to varying degrees of oxidation and hydration. The latter determine the overall coloring of the lateritic formations or of individual horizons, with a red color corresponding to more xeromorphic and a yellow color to more hydromorphic formations. According to analytical data, most of the lateritic

Table 1

LATERITES

Group	Subgroup	Geographical location and soil-forming conditions	Depth of specimen (cm)	Molecular Ratio $SiO_2:R_2O_3$	$SiO_2:Al_2O_3$	$SiO_2:Fe_2O_3$
Typical laterites	Podzolized laterite (incomplete profile)	Brazil, No. 50, 1956 Tropical forest Parent material: lacustrine alluvium	0-10	3.90	4.33	39.84
			20-30	2.91	3.22	30.53
			50-60	2.28	2.52	23.37
			130-140	1.96	2.15	21.25
	Podzolized laterite (deep profile)	China, No. 70, 1955 Pine plantings Parent materials granite	0-10	5.74	6.87	34.88
			20-30	5.04	6.04	31.00
			40-50	4.92	5.94	28.48
			80-90	3.70	4.34	25.56
			120-130	4.17	4.97	26.55
			200-210	2.45	3.60	16.47
			300-310	2.77	3.33	16.64
Ferruginous laterites	Profile saturated with concretions	Senegal, No. 71, 1952 Savanna plateau Parent material: sandstone	0-0	9.52	15.00	26.90
			concr.	1.43	3.63	2.35
			40-50	8.10	10.37	36.93
			concr.	0.63	1.38	1.78
			60-70	7.44	9.67	32.34
			concr.	0.63	1.56	1.07
			120-150	1.13	3.26	1.72

Table 2

ALLOPHANITES

Group	Geographical location and soil-forming conditions	Depth of specimen (cm)	Molecular Ratio $SiO_2:R_2O_3$	$SiO_2:Al_2O_3$	$SiO_2:Fe_2O_3$
Laterized allophanites	China, No. 33, 1955	0-10	1.32	2.06	3.59
	Plateau	10-20	1.26	1.96	3.54
	Tropical forest	30-40	0.93	1.44	2.65
	Parent material: basalt	120-130	1.05	1.58	3.11
	Brazil, No. 44, 1956	0-20	1.49	2.35	4.07
	Pasture land	100-110	1.17	1.82	3.30
	Basalt plateau	200-210	0.94	1.93	2.52
Allophanites	India, No. 5, 1955	0-10	4.21	6.20	13.10
	Plain	10-20	4.28	6.57	12.20
	Parent material: traprock	60-70	4.31	6.63	11.97
		100-110	4.00	6.10	11.78
		150-160	4.03	6.67	10.22

formations exhibit eluviation of part of the silica and a relative accumulation of alumina and iron oxides compared with the composition of the parent material (except for the uppermost horizon, which is often podzolized).

2. There is a great diversity of natural forms of manifestation of the laterization process, which is quite consistent with the great variety of physical-geographic conditions in tropical and subtropical countries. The above-mentioned features of the laterization process are clearly evident in the majority of soil-geological surface formations in constantly humid subtropical regions (southern China, Japan). They are lacking in the soils of variably humid and arid regions situated in the northern part of the subtropical zone (Algeria, Tunisia) and are only slightly evident in its southern part (northern India).

All truly tropical regions (including the equatorial) are distinguished almost everywhere by the presence of laterization processes, whose degree of development depends on the humidity of the climate. Lateritic formations reach their greatest thickness in constantly humid regions; however, even the driest tropical areas show clearly expressed lateritic phenomena (for example, the caatinga of northeastern Brazil).

Under the dense rain forest of the constantly humid tropical regions, a podzolization process develops in the upper horizon of the lateritic soil, stimulated by the action of the acid humus material produced by the forest litter. As a result of the podzolization processes, the upper horizon of the forest laterites takes on a yellow coloring, becomes enriched in residual quartz and loses a large part of its aluminum and iron, which are carried to lower horizons (in the form of complex organic mineral compounds). The effect of the podzolization process does not extend deeply into the soil; its middle and, especially, its lower horizons are of the allitic weathered type. In treeless tropical regions, under savanna grass cover, a turf-forming process takes place in the upper horizons of the laterites, producing a distinct yellow-colored surface zone of active soil formation and a humus horizon of varying thickness.

3. On the basis of the foregoing, we must distinguish, in the first place, tropical laterites and subtropical lateritic soils among the recent lateritic formations. The differences between them result only from varying thermal conditions of soil formation and are not qualitative in character; laterites and lateritic soils differ only in the degree of development of the laterization process and the over-all thickness of the soil profile. The profile of tropical laterites may reach tens of meters and the profile of the subtropical soils is usually of the order of several meters. The transition from tropical laterites to subtropical lateritic soils is very gradual.

Another important distinction of lateritic formations is related to changes in the humidity factor. We distinguish extra-laterites (allites) and extra-lateritic soils (allitic soils) characteristic of constantly humid tropical and subtropical regions from ferruginous laterites (ferrites) and ferruginous

lateritic soils (ferritic soils) characteristic of dry tropical and subtropical regions, with an intermediate grouping of typical laterites (allito-ferrites or ferro-allites) and typical lateritic soils (allito-ferritic and ferro-allitic soils) characteristic of semi-humid tropical and subtropical regions.

It is evident from the foregoing division of lateritic formations that it is related closely to the existence of a more or less pronounced and lengthy dry season. Field observations show that the presence of such a season has an important effect on the laterization process. The coming of drought apparently affects greatly the dynamics of soil formation in the laterite, especially the mobility of the basic components of the mineral mass. It is quite probable that drought has the greatest effect on colloidal material, which in that case loses its mobility and becomes firmly fixed in the soil. In any case there is every reason for assuming that a close connection exists between the formation of ferruginous crusts (hardpan), compact intercalated horizons and large accumulations of concretions and the given degree of periodic aridity of the climate of tropical areas. We found the best examples of lateritic hardpan in the tropical semi-desert (caatinga) of Brazil, and the best ferruginous lateritic concretions in the dry savannas of Senegal and in the serrados of the Brazilian plateau. Incidentally, many of these formations are obviously relicts, preserved because of their resistance to the surface erosion and deflation processes that have already removed the upper layers of loose lateritic material.

4. Another important factor in the formation of laterites and lateritic soils is the petrography of the parent material. Most important is the development of laterites on acidic or basic rocks of igneous origin.

This factor is clearly evident in soil formation in subtropical areas, where the laterization process is most advanced on rocks of acidic composition. The process is not so evident on basic rocks (for example, basic eruptives) because of the rapid formation of secondary clay minerals. The black subtropical soils formed under these conditions are so distinctive and so different from lateritic soils (red and yellow soils) that they must be designated by a special term. We propose to call them allophanitic soils. They are rich in secondary clay minerals of possibly secondary synthetic origin (allophanes) saturated with bases and colored very dark, probably because of the firm links between some humus materials and the mineral colloids. It is interesting to note that allophanitic soils are formed in various kinds of subtropical areas: both in humid areas (for example, the black ashy soils formed on recent volcanic formations in Japan) and in dry and semi-humid areas (for example, the smolnitsa and tirs soils of the Mediterranean region). (Editor's note, S. G.: The smolnitsa soil is found in the Balkans and the tirs soil in Morocco.)

In tropical regions, where the laterization processes are more intensive the basic composition of rocks affects soil formation most heavily in a semi-humid climate, and to a lesser extent in a humid climate. We therefore distinguish two types of allophanites: (a) dark-colored (humus) allophanites of the dry tropics (for example, the regur soils of India); (b) laterized

allophanites in the semi-humid tropics (the terra rossa of Brazil) or in the humid tropics (the "laterites" of southern China and Hainan).

5. On the basis of the foregoing, we can classify recent laterites and lateritic soils as follows:

A. Laterites and allophanites of the tropics.
   1. Extra-laterites (allites).
   2. Typical laterites (mixed allito-ferrites and ferro-allites).
   3. Ferruginous laterites (ferrites).
   4. Humus allophanites (regurs).
   5. Laterized allophanites.

B. Lateritic and allophanitic soils of the subtropics.
   1. Lateritic soils (red and yellow soils).
   2. Allophanitic soils (black subtropical soils, smolnitsa and tirs soils.

Some analytical data on these formations are given in Tables 1 and 2 (pp. 34-35).

For purposes of completeness, we must also outline, however concisely, the system of soil transitions that link laterites and lateritic soils with other genetic soil types.

In the subtropics we can now distinguish the following soil series:

A. Red and yellow soils (lateritic soils); allophanitic soils.
B. Yellowish-brown soils transitional to gray-brown forest soils of the boreal type.
C. Reddish-brown soils transitional to the brown soils of dry woods and shrubland.
D. Reddish-brown soils transitional to saline crusts of deserts.

In the tropics we can also distinguish transitional series linking laterites and allophanites with each other and with the subtropical soil types.

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THE CARTOMETRIC STUDY OF LANDSCAPES

By V. A. Nikolayev and Chang Mu-tung

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1961, No. 2, pp. 3-9)

(Abstract: The authors describe a cartometric method of analyzing natural landscapes for developmental purposes. Cartometry is designed to provide a quantitative evaluation of the morphologic structure of the landscapes of a given study area. Taking an area in the northeastern part of Kustanay Oblast, the authors prepared sample maps showing the lake coverage of the area, the economic potential of the hydromorphic units of the landscapes, and the morphologic structure of the landscapes.)

Modern topographic maps representing natural reality are in themselves important objects of physical-geographic research (Reference 3). Until recently map-study methods developed somewhat onesidedly. The greatest successes were achieved in the field of cartometric analysis of relief and drainage patterns (1,2,5).

However the sphere of possible application of cartometry does not end there. Topographic maps compiled on the basis of aerial photographs and carrying a sufficiently heavy load of physical-geographic information make it possible by cartometric means to study not only individual components of the natural environment but natural territorial complexes as a whole.

The energetic development of landscape-mapping field methods in recent years and the need for bringing landscape maps closer to practical needs make it possible to speak of the purposiveness and timeliness of using cartometry in landscape research and mapping. Unfortunately many physical geographers still strive relatively seldom toward a comprehensive interpretation of the contents of a topographic map, regarding the map merely as a base for field work and map compilation. Field methods for studying the morphologic structure of landscapes will undoubtedly continue to play a basic role. But at the same time methods should be developed for office analysis of landscapes on the basis of aerial photographs and large-scale topographic maps.

Topographic map objects such as forests, swamps, meadows, sands, solonchaks (saline desert soils) and takyrs (clayey polygonal desert soils) represent nothing else but natural territorial complexes. More often than not they correspond to the concept of urochishche (natural unit) or complexes of such units in the nomenclatural system of internal morphological landscape units (4). At the same time the map discloses spatial interrelationships between natural and agricultural lands, showing to what extent the geographic environment has been utilized by man. Under these conditions cartometric analysis of the landscape content of topographic maps does not present any special difficulties and could become an extremely important method for quantitative evaluation of the morphology of landscapes.

The results of cartometric analysis of landscapes are presented most fully and expressively in the form of cartograms and map diagrams supplementing the usual morphogenetic landscape maps, which generally lack quantitative indicators. In contrast to the latter, such cartograms and map diagrams can be arbitrarily called morphometric landscape maps.

The authors gained their experience of compiling morphometric landscape maps in areas of northern Kazakhstan (Kustanay Oblast), where hundreds of thousands of hectares of virgin and idle lands were plowed in recent years. At first cartometric estimates were needed for a quantitative evaluation of the average field size in view of the presence of large numbers of small lakes and birch groves in the plains on the southern margins of Western Siberia. Later the estimates were broadened to include most of the basic types and groups of landscape units suitable not only for crop raising but for other forms of agriculture.

We show below fragments of experimental map samples of the lake coverage, hydromorphic complexes and morphological structure of the landscapes of the northeastern part of Kustanay Oblast. The content of these maps was dictated by the specific character of the natural conditions of the territory, situated at

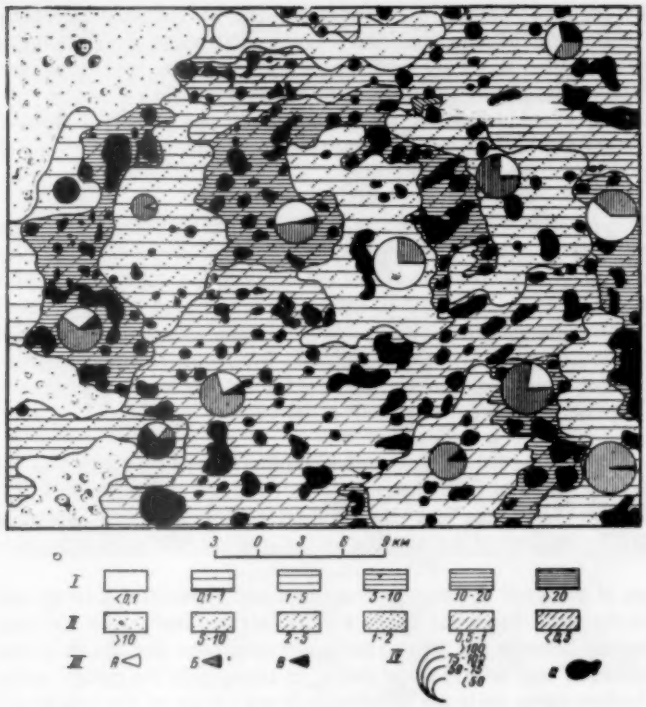

Fig. 1. Lake-coverage Map

I. area of lakes, in per cent of total area;
II. mean sizes of interlacustrine plots, in thousand hectares;
III. lakes:
A - overgrown with reeds;
B - with shoreline reed growths;
C - open lakes
IV. mean lake sizes, in hectares.
a. lakes.

the juncture of the wooded-steppe and steppe zones, where beef and dairy cattle play an important part next to grain growing. The large number of lakes in the area may in the next few years provide the basis for the massive raising of waterfowl and for fisheries. In our cartometric study of these areas we therefore tried in the first place to obtain data on the degree of water coverage, meadow and pasture lands, timber reserves and, most important, the amount and quality of arable lands.

The cartometric office work was preceded by a landscape field survey in which the boundaries of the basic types of landscapes were mapped at the scale of 1:100,000.

The landscape types consist of different variants of territorial complexes of eluvial, hydromorphic and natural water units. The class of eluvial units consists mainly of chernozem steppe on the elevated plains, gentle slopes and broad, low ridges among the lakes and birch groves. The class of hydromorphic units includes humid and waterlogged birch groves in depressions, meadow solonets and solonchak soils, meadows and swamps. Lakes and rivers make up the class of natural water units.

Cartometric study of these types and classes of natural units enabled us to make a quantitative evaluation of the morphologic structure of the landscapes in the given area. The final estimates of the areas of the natural units were obtained from the map at 1:100,000 within the boundaries of the landscapes identified within the area. In addition each landscape was divided on the basis of subsequent study of the topographic map into morphological variants which made it possible to obtain more detailed quantitative characteristics not only of the landscape as a whole but of its parts.

Areas were measured with a transparent overlay carrying a pattern of 2-mm. squares, corresponding to 200-meter squares in nature at the scale of 1:100,000. In view of the fact that the final morphometric map was to be at 1:300,000, the size of the squares on the overlay was quite adequate.

The areas of all types of natural water units and hydromorphic units were measured on the map. The areas of the eluvial (steppe) units were obtained as the difference between the area of the given landscape and the total area of its hydromorphic and natural water units. In contrast to the natural water units, the hydromorphic units are unfortunately not shown on the topographic map sufficiently fully and comprehensively. For example, the same conventional symbol was used on the map of the given area to designate both meadow solonchak and meadow solonets soils. Moreover the latter were evidently shown only in part, mainly around lakes. The solonets areas fringing the humid aspen and birch groves were generally not shown on the map. This explains the partial reduction of the solonets coverage compared with what is actually found in birch-grove landscapes and, on the other hand, the increase in the areas of the chernozem-steppe units.

Of course, the fullest and most precise inventory of all landscape units can be obtained from aerial photographs and photo-maps, but for the purpose of compiling medium-scale morphometric maps the 1:100,000 topographic map is adequate as a base -- with some qualifications.

As a result of cartometric measurements, we obtained a large number of absolute and relative (percentage) indices for each internal landscape division, which were then arranged systematically in the form of tables. Depending on the purpose, any group of indices can easily be selected from the tables for each map.

The lake-coverage map, or map of natural water units (Fig. 1), contains the following indices: the degree of lake coverage of the territory, in per cent

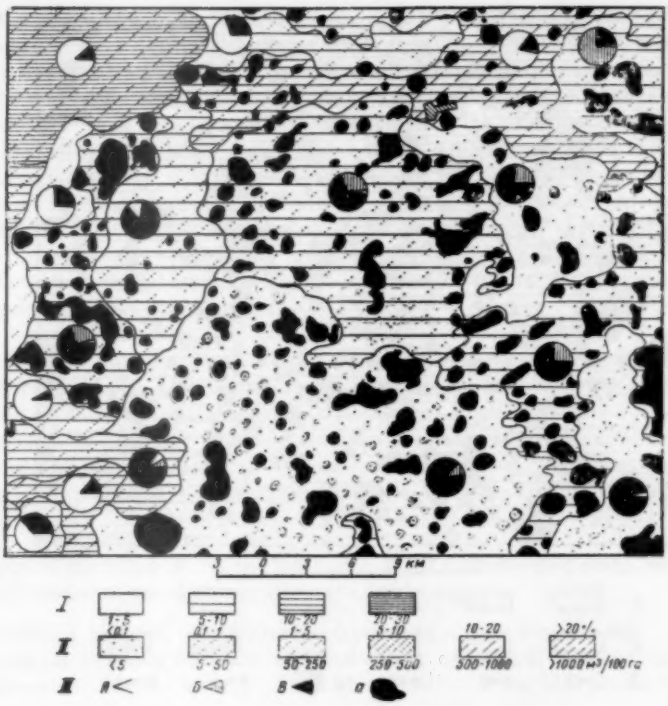

Fig. 2. Map of the Hydromorphism of Landscapes

I. area of hydromorphic units, in per cent of total area.
II. forest coverage, in per cent of total area, and timber supply, in cubic meters per 100 hectares.
III. hydromorphic units:
A - forest groves
B - solonchak and meadow solonets
C - swamps, meadows
a. lakes.

of the total area (cartogram); the mean sizes of interlacustrine parcels (Pl) in hectares, according to the formula $Pl = \frac{P - Pla}{n}$, where P is the area of the given landscape, Pla the total area of the lakes, and n the number of lakes (cartogram); the percentage areas of lakes overgrown with reeds to varying degrees (pie-chart sectors); mean areas of lakes in hectares (diameter of the pie-chart circle). Such a map provides material for judging the water coverage of a territory, the degree of parceling of interlacustrine steppe areas, the reed reserves on the lakes and many other aspects of the economic evaluation of landscapes.

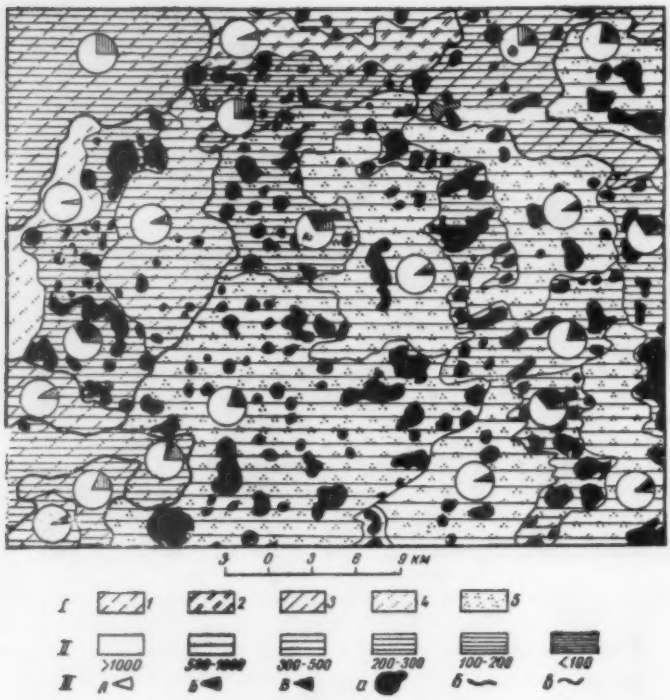

Fig. 3. Map of the Morphologic Structure of Landscapes

I - Landscape types:

Wooded steppe (birch-grove steppe, richly herbaceous, red-feathergrass steppe on loamy ordinary chernozems, with aspen-birch groves on solod soils):

1 - slightly waterlogged, slightly solonized, on level eluvial plains;
2 - waterlogged, solonized, on gently rolling lake plains;
3 - solonized meadow solonchak on lake-and-ridge plains.

Steppe (herbaceous, red-feathergrass and feathergrass steppe on heavy, loamy ordinary chernozems):

4 - waterlogged, on gently rolling lake plains;
5 - solonized meadow solonchak, on lake-and-ridge plains.

II - mean sizes of arable chernozem-steppe parcels, in hectares.

III - natural units: A - eluvial (chernozem steppe); B - hydromorphic (groves, swamps, solonchak, meadow solonets): C- water (lakes).

a - lakes; b - landscape-type boundaries; c - boundaries of morphologic variants (subtypes) of landscapes.

On the map of hydromorphic units (Fig. 2) the cartogram method was used to represent all types of humid natural units: birch groves, swamps, meadows, meadow solonchak and meadow solonets. These types of lands are unsuitable for crops and can be used either for forestry (birch groves) or as pastures and hay meadows. It is therefore important to establish the quantitative relationships between types of hydromorphic units, which was done in the form of pie charts. In view of its practical importance, the forest coverage of the landscapes was especially indicated in per cent of the total area (cartogram). Since data were available on the average timber reserves per hectare of birch grove, it was easy to estimate the timber supply of various parts of the study area. A similar method could be used to estimate the natural feed reserves on hay meadows and solonets pastures.

On the last map (Fig. 3) an attempt was made to express in quantitative indices the degree of participation in the landscapes of the three major types of natural units: eluvial, hydromorphic and water. Pie charts were used for that purpose. In addition, special importance was attached to showing the mean sizes of arable parcels, in other words, the eluvial, chernozem-steppe units (cartogram). The average sizes (P') were calculated according to the formula $P' = \frac{P - P_{la}}{n} - P_h$, where P is the area of the landscape; P_{la} is the total area of the lakes; P_h is the total area of the hydromorphic units, and n' the total number of non-arable units in the landscape.

We found it possible to combine the given type of map showing the morphological structure of landscapes and eluvial units with the usual type of morphogenetic landscape map. The latter constitutes the background for the morphometric indices.

It seems to us that this mapping experiment shows that cartometry is able to yield valuable quantitative data regarding the structure of landscapes and their natural resources. Metrical analysis of large-scale maps and especially of aerial photographs makes it possible with great precision to identify dominant, subdominant and subordinate units in landscapes. In particular, such analysis makes it possible to determine the direction of development of contiguous landscapes, for example, steppe and forest-steppe, distinguished by greater or lesser penetration of various types of natural units beyond their usual range of distribution.

At the same time cartometry is one of the ways of evaluating landscapes from the land-use point of view. The nature of the relationships between natural types of lands in various areas may be important in determining the specialization of the farms to be organized on the new lands as well as the character of the land use within the farms.

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THE SCIENTIFIC PRINCIPLES OF THE CONTENT OF A GEOGRAPHY COURSE OF THE SOVIET EIGHT-YEAR SCHOOL

By P. G. Kochergin

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1961, No. 2, pp. 19-23)

(Abstract: The author, a member of the Geography Department of Kursk Teachers' Institute, makes two points about the teaching of elementary-school geography in the Soviet Union: (1) The present topical approach should be replaced by a genuinely regional method; (2) physical geography should not be taught in isolation from human society, but as a condition for the development of society.)

(Soviet editors' note: It has long been a tradition for geographers of Moscow University, as far back as D. N. Anuchin's times, to take an active part in the writing of good-quality middle-school textbooks. The following article by P. G. Kochergin discusses the problem of the content and scientific level of geography courses taught in Soviet eight-year schools.)

Between geography as a science and geography as a subject of instruction there are substantial differences in aims, tasks, content and point of view. Nevertheless, the content of school geography should reflect the essence of geographic science, its methodology, its present-day tasks and its significance.

The content of school geography should correspond to the new tasks that Soviet schools face at the present time. Does the present geography course in the eight-year school meet those requirements?

Unfortunately it must be noted that the curriculum approved for the new

eight-year school is identical with the old program of the former seven-year school, with all its substantial shortcomings from the point of view of content methodology and teaching methods. Since it is not possible to discuss in a short article all the basic questions of the content of school geography for the eight-year school, we will limit ourselves to what we consider the two most important problems: first, the character of the content, and, second, its tie-in with life and with the practice of Communist construction. We know that geography is concerned with the study of the landscape envelope of the earth as a whole and of its parts. That envelope represents a complicated complex consisting of various interrelated components. Therefore all objects and phenomena of geography are studied integrally. That principle is the fundamental basis of geography. N. N. Baranskiy has authoritatively pointed out, "that study of the relationships between various spatial phenomena represents the very essence of geography, its 'core', without which geography would lose its raison d'etre" (N. N. Baranskiy, Ekonomicheskaya geografiya v sredney shkole. Ekonomicheskaya geografiya v vysshey shkole (Economic Geography in the Middle Schools. Economic Geography in the Higher Schools), Moscow: Geografgiz, 1957, p. 124).

It happens that this "essence of geography," its "core," is only slightly reflected in the content of the geography course for the eight-year school. We can go so far as to say that, instead of complexes, the course is concerned with the study of individual elements of nature without proper relationships between them. School geography therefore remains to a large degree a collection of facts that are not related to one another.

Take, for example, the elementary course in physical geography, which continues to be taught in the 5th grade, where each element of nature is studied separately: for example, land under the study topic "Land forms"; water under the topics "Waters of the land" and "Oceans"; climate under the topic "Weather and climate." But with the best of intentions we can find no relationships between those topics. Land is studied only from the point of view of land forms; for purposes of illustration, some land forms are named and located on the map. Not a word is said about relationships between land, water and climate.

The topic "Waters of the land" is discussed from a purely hydrological point of view. It includes definitions of various concepts, such as stream channel, valley, floodplain, drainage basin, divide and so forth. The streams themselves are completely lost in all those definitions. No relationships are established between streams and the land, streams and climate, streams and the oceans.

The topic "Weather and climate" is studied from a strictly meteorological standpoint. It is also not related to the other topics.

The entire course is altogether not very geographical. It is a conglomeration of bits of geomorphology, hydrology, meteorology, topography and mathematical geography. Natural territorial complexes are not even mentioned.

Nor are complexes mentioned in the courses on the geography of continents and the geography of the USSR. There, too, the basic approach is through the location of individual components of the natural environment.

The geography of those huge areas is studied as follows: first, the location of oceans, bays, straits, islands and peninsulas; then the location of major surface forms, such as lowlands, plateaus and mountains; seismic and volcanic areas are studied separately; there is discussion of the distribution of minerals, average temperatures and precipitation, rivers and lakes, and natural zones. In addition, there is some information on population and political-administrative divisions.

This kind of geography can be called with complete justification anatomized geography. It consists in dissecting each area into its components, each of which is then examined separately, mainly from the point of view of location. It is quite natural that such "geography" gives students no proper conception either of countries or of landscapes. For example, in the study of Europe, mention is made seven times of the Scandinavian Peninsula, but the student is unable to picture the geographical characteristics of that area. The same is true for other geographical regions of Europe -- the Iberian, the Apennine, the Balkan peninsulas, the Carpathians, the Danube lowlands, and so forth. It is quite understandable in view of the fact that they are not the objects of study in that course. Even when it comes to such a distinctive and clearly identifiable geographical region as the Amazon basin, the student does not acquire the proper picture, despite the fact that he studies it successively as part of the earth's surface, as a distinctive climatic region, as a river valley and, finally, as a zone of tropical rain forests.

The entire content of the course on the geography of continents is thus strictly topical in approach. This follows directly from the false statement of aims in the explanatory note of the curriculum, which is "...to impart knowledge concerning the physical-geographical characteristics of the population and the political map of the continents" (Programmy dlya vos'miletney shkoly. Geografiya (Curricula for the Eight-Year School. Geography), Moscow: Uchpedgiz, 1960, p. 7).

In other words, the basic task is to provide a general picture of continents as a whole. We know, however, that every continent consists of an assemblage of diversified natural regions distributed according to definite laws over the huge land areas. But it seems to us that the course on the geography of continents should also strive to acquaint students with the diversity of natural conditions in the major parts of the continents. That aim agrees with the general task of geography, which Baranskiy formulated thus: "Geography should study differences from place to place."

The university courses on the geography of continents have been organized with precisely that object in mind. They devote most of their time to regional differences and cover topical information by components merely as an introduction to the courses. For example, the textbook Fizicheskaya geografiya Zapadnoy Yevropy (Physical Geography of Western Europe) devoted 70 pages

to the general survey and 323 pages to the regional part; in the book Zarubezhnaya Aziya (Asia Outside the Soviet Union) the space allotments are 26 and 549 pages, respectively. The elementary course on the geography of continents should, of course, be organized on a regional basis according to the same principle.

The middle-school course on the geography of the USSR is unfortunately also not free of the above-stated shortcomings. Any geographical region or Soviet republic is studied from the same "anatomized" point of view. Discussion of major geographical units is virtually absent, relationships between components are mentioned only occasionally, and the specific character of the major regions therefore remains unclear. The main attention in this course is again concentrated on individual components of the natural environment. Such an approach has been adopted in K. F. Stroyev's textbook (Fizicheskaya geografiya SSSR (Physical Geography of the USSR), a 7th-grade textbook, Moscow, Uchpedgiz, 1957). In strict accordance with the former curriculum, it discusses each natural component separately -- relief, climate, rivers and lakes, natural zones and so forth. Even components that are intimately related to one another are treated separately. For example, in describing Eastern Siberia, the author does not talk about the minerals of the plateau, the Sayan Mountains, or the Cis-Baykal and Trans-Baykal mountains, but merely of minerals of Eastern Siberia as a whole. Even when he mentions the interesting fact that diamonds were discovered in the Yakut ASSR, he does not point out that the site lies in the Middle Siberian plateau. It is quite obvious that such an approach fails to give students a proper picture of the geographical characteristics of natural zones, republics and regions of the USSR.

That is why we can assert categorically that the content of Soviet school geography still does not adequately reflect the essence of geographic science and its distinguishing characteristics, does not uncover the taks that it faces at the present time and does not point up the importance of geography for the national economy and culture.

In our opinion, the geography course for the eight-year school should be thoroughly reorganized in accordance with the needs of scientific geography and the tasks that Soviet schools face at the present time.

The eight-year school should teach genuinely regional courses. It should concentrate on the geography of the USSR, making it the basic course. For every continent it should carefully select (concise generalization is essential here) major geographic regions and study them integrally, as a single whole, including population and economic activities. Only then would the courses become truly regional. "The task of regional geography," wrote D. N. Anuchin, "Is to provide a complete, true and clear picture of the given region from the geographical point of view" (D. N. Anuchin, Izbrannyye geograficheskiye rabotv (Selected Geographical Works), Moscow, Geografgiz, 1949, p.36). Our past teaching experience has clearly shown that geography students are more interested in countries and peoples than in individual components of the natural environment.

In order to make the course on the geography of continents regional, it seems to us that every continent should be covered in a brief introduction (2-3 lessons) and that the main attention should be on a regional survey stressing the principal distinctive characteristics. The same principle should be followed for the course on the geography of the USSR: a brief general survey of the Soviet Union (4-5 lessons), followed by discussion of the major geographic regions.

The components of the natural environment should serve as material for making clear the specific geographical characteristics of each region. They should be presented, not as accidental phenomena, but as an essential component part of the entire natural complex. The textbook should make clear their influences on one another and how dominant factors cause all others to change.

The content of the geography course that has been approved for the eight-year school is not closely related to life and to the practice of Communist construction. The natural environment is still being studied separately, without people, and data on population are generally given at the end of the geographical surveys (of continents or the USSR) without any tie-in to the natural geographical environment and the conditions under which man lives and works. Students are always interested in the life of people of other countries. Baranskiy wrote that "skilled geography teachers have long been in the habit of starting a lesson about Arctic regions (say, northern Canada) or about tropical regions (for example, the Amazon basin) with a story about the life of the people living in those areas. Having been thus stimulated, students are more willing to listen to a description of the natural environment of those areas" (Baranskiy, op. cit., p. 125). However in school geography the natural environment is studied without people: neither in the mountains, nor in the plains, nor on the banks of rivers nor on the shores of seas are there people. Even in the course on the geography of the USSR there is no real tie-in with life. If there is an occasional attempt to establish a link between the content of geography and life, it is usually done in an extremely formal way and expressed in general phrases. For example, Stroyev's textbook contains a chapter on "Man's influence on the natural environment," which talks in a most general way about man's use of natural resources. Here are some excerpts: "In the cold tundra, the remote tayga and in high mountains, new cities are rising and roads are being built; in the dry steppes and the hot desert, reservoirs are being established and irrigational canals are being dug. Crop raising has advanced far to the north in the Soviet Union; trees are being planted in the steppes and wooded steppes; in the steppes virgin lands are being plowed and new productive breeds of domestic animals are being raised" (Stroyev, op. cit., p. 73). The author does not cite a single specific example. The tie-in between geography and practice is therefore purely declarative and not supported by facts.

This basic shortcoming, which was noted in the statement of the party's Central Committee and the Council of Ministers USSR "On the strengthening

of the tie-in between school and life and the future development of the system of public education in the Soviet Union", continues to be characteristic of the entire course of school geography. That is why the course should be reorganized on the basis of certain ideas. The most important, in our view, are the following:

1. People live under various geographical conditions: in plains and in mountains, in cold polar regions and in hot deserts, in forests of the temperate belt and in tropical rain forests; their various ways of life are conditioned not only by natural-geographic but social-economic conditions.
2. Nature provides the material resources utilized by human society and without which it could not exist. That is why natural resources should be treated carefully and lovingly and used wisely.

In school geography the natural-geographic environment should be studied "as a permanent and essential condition for the development of society." It should also be stressed that human society itself has an increasing influence on nature. The result is the creation of the necessary material goods without which not only the development but the very existence of human society would be unthinkable. The presentation of school geography in that light would better reflect actual reality and insure a closer tie-in between education and life, between education and the practice of Communist construction, which in turn would promote a better conception of the teaching material and reveal to the students the importance of geography as a science. It seems to us that the content of the geography course for the eight-year school should be reorganized along those lines.

MAPS OF WATERS OF THE LAND IN NATIONAL ATLASES

By T. G. Svatkova

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1961, No. 2, pp. 27-33)

(Abstract: In this article, which is part of a series on national atlases, the author makes recommendations for the selection of maps and map content to be incorporated into the atlas section devoted to the water resources of the land. She divides the maps into two major classes: maps of drainage patterns, and maps of the characteristics of stream regime.)

The 18th International Geographical Congress, which met in 1956 in Rio de Janeiro, listed as one of the principal scientific and practical tasks of present-day geography the creation of national atlases based on modern scientific knowledge of the physical, economic and political geography of the given country and ordered as the immediate task the formulation of ways of raising the quality and the unification of such atlases.

This was the theme of the conference of the Commission on National Atlases of the International Geographical Union that met August 11-20, 1958, in Moscow University under the chairmanship of K. A. Salishchev. Discussion of the contents of existing atlases revealed the depth of their differences, related not only to the diversity of natural, social and economic conditions in the various countries, but to a subjective approach in planning the list of maps, in selecting map content, methods of representation and so forth. At the conference Soviet geographers expressed their readiness to prepare for the 1960 Congress in Stockholm a list of recommendations for the improvement and unification of national atlases.

As part of that program, the present article analyzes the topics and the content of maps of waters of the land. As shown by existing national atlases, the section on maps of waters of the land varies greatly and is often incomplete (see Table I on p. 53).

The great scientific and practical importance of a national atlas calls for completeness of content, a high scientific level and practical orientation of the various atlas sections.

It is quite clear that serious attention should be given to the representation of the waters of the land, not only because of their influence on other components of the natural environment, but because of their importance for agriculture, industry and transportation.

Proper selection of maps and map content in the physical-geography section of an atlas makes it possible to study, on the one hand, the effect of climate, geological structure and soil-and-vegetation cover on the volume and the regime of waters of the land and, on the other hand, the effect of waters of the land on the relief and the soil-and-vegetation cover of the given area. Maps of waters of the land in many cases explain the trend of development of agriculture, the character of the location of industry and the characteristics of settlement. They also provide a picture of the water-power and transportation potential of the country.

The practical problems that can be solved by means of atlas maps depend to a large degree on the map scale. A sufficiently large scale makes possible not only over-all planning, but also concrete planning of the construction of specific hydraulic projects, the development of irrigation and drainage systems, and the use of surface and ground waters for agricultural or industrial purposes.

Full-fledged national atlases should fully characterize the supply of surface (and sometimes ground) waters of an area and the regime of such waters. Despite the great diversity of hydrological conditions in various countries, there are therefore a number of maps that must be included in the national atlas of any country. They are hydrographic maps and maps of the regime of waters, especially maps of runoff and stream flow. These maps make up the section on waters of the land in most of the published national atlases (see Table I on p. 53).

From that point of view we cannot consider as complete the section on waters of the land in the atlases of Poland, Czechoslovakia, the Congo, Tanganyika and others, which have only hydrographic maps, and the atlases of the Belorussian SSR and Italy, which have only maps on the regime of waters.

Two types of hydrographic maps are found most frequently in published national atlases. In some atlases they are very detailed because they have been based on large-scale maps with little generalization. For example, in the atlas of France, the map at 1:2,500,000 has been compiled from base maps at 1:500,000 (all streams with a length of more than 0.3-0.5 mm at the map scale are shown); in the atlas of Sweden, the map at the scale of 1:2,000,000 has been based on maps at 1:100,000 (all streams with a length of 2-3 mm at the map scale are shown); in the atlas of Lower Saxony, the map at 1:800,000 has been compiled from base maps at 1:200,000. The legend of such maps is simple: permanent and intermittent streams, lakes, canals, swamps, areas of karst drainage. As an exception, the hydrographic map of Sweden also shows the boundaries of drainage basins and distinguishes the principal streams in color. This additional treatment greatly adds to the legibility of the map.

A far more generalized picture of the water resources of areas is provided by the maps of the atlases of Poland, Czechoslovakia, India, the Congo, Finland, Leningrad Oblast and the Karelian ASSR and others. The degree of generalization of the drainage net varies on these maps. Greater detail is shown, for example, in the atlas of India (all streams with a length of 5-7 mm at the map scale). In the atlas of Poland, on the other hand, the drainage net on the hydrographic map is shown in the same detail as on the other maps of the atlas (with a length of 1.5-2 cm at the map scale). Some of the hydrographic maps with a generalized drainage pattern also show the drainage basins of the principal streams (the atlas of India) and of the tributaries of varying orders (the atlases of Poland, Czechoslovakia, Leningrad Oblast and Karelian ASSR and others). The thickness of lines, colors or the pattern of the boundary lines make it possible to distinguish easily the order of the drainage basins. For better legibility, the various drainage basins are distinguished by color tints.

The substitution of an orohydrographic map for a hydrographic map, as in the atlas of Belgium, is not to be recommended. Joint representation of relief (by hypsometric contours) and hydrography does not make it possible to show the drainage pattern in desirable detail.

A detailed hydrographic map provides the most complete method of representing a country's water resources. It shows the actual density of the drainage net and makes it possible to correlate the character and the density of the drainage net with the climate, geological structure and relief of the given area. However, for most countries it would be difficult to include additional material on the same map, such as drainage basins, their areas, drainage-density indices and so forth. Two hydrographic maps, as in the

Table I

Maps of waters of the land		Australia (10)	Belgium (4)	BSSR (1)	B. C. (11)	India (18)	Italy (3)	Carinthia (17)	Congo (7)	Leningrad Oblast (2)	Mexico (8)	Lower Saxony (9)	Norway (17)	Poland (14)	Tanganyika (12)	Finland (5)	France (6)	Czechslovakia (15)	Sweden (13)
Maps of the drainage net	Hydrographic maps compiled from large-scale maps											×					×		×
	Hydrographic maps with generalized drainage pattern	×			×	×		×	×	×	×	×		×	×	×		×	
	Orohydrographic maps		×			×													
Maps of the stream region	Surface runoff			×						×		×				×	×		×
	Stream flow	×			×		×	×				×				×	×		×
	Hydrologic regionalization						×			×							×		
	Floods (maps and graphs					×				×							×		
	Lake coverage																		
Maps of Lakes	Maps of major lakes							×					×		×		×		
	Ground-water maps	×						×				×							
	Other maps							×	×			×	×		×			×	

atlas of Lower Saxony, are therefore recommended. The basic map would be very detailed, having been based on large-scale maps or the most complete available cartographic and textual sources (if possible, all streams with a length of 0.5-1 mm at the map scale should be shown). The second hydrographic map would be complementary. On it the drainage pattern would be generalized, but it would show the drainage basins of the principal streams and of tributaries of various orders, data on the areas of basins and drainage-density indices. The two maps could be combined in the case of arid regions with a sparse drainage pattern.

The problem of generalization becomes especially important in the detailed compilation of a small-scale hydrographic map. The map must clearly distinguish the principal streams and drainage basins and reflect the relative drainage density and type of drainage pattern as well as the characteristics of stream channels (mountain and plains streams, the presence of a floodplain, the degree of meandering, and so forth). Selection and generalization on the hydrographic map should take account of the climate, the geological structure and the orography of the area. The thickness of the lines of the principal streams and their tributaries should be so selected as to ease the legibility of the subordination of streams. Some exaggeration is sometimes necessary in reflecting the characteristics of mountain and plains streams.

The character of the longitudinal stream profile can also be reflected on the hydrographic map through the use of conventional symbols designating rapids and falls. There is no justification for using a schematic representation of the drainage net in that case (as on the waterfall maps of the atlases of Finland and of Norway). The longitudinal profile of major streams on the hydrographic map can best be illustrated by means of appropriate graphs.

The complementary hydrographic map should employ color tints for greater legibility in distinguishing drainage basins; basins related to a single major streams or sea should be shown in various shades of the same color. Reference data on the area of drainage basins and drainage-density indices can be placed within the drainage basins.

Maps of the regime of streams in atlases are especially interesting from the point of view of the practical utilization of the atlas for evaluating water resources for purposes of water supply, power generation and reclamation. The most complete representation of the regime of surface waters is found in the atlas of France, which contains maps of surface runoff and stream flow, maps and graphs of stream-regime types, and maps of areas subject to flooding. Most of the national atlases give an incomplete picture of stream regimes because they contain only one or two maps with a few indices (the Belorussian atlas, for example, contains only a map of surface runoff; the atlas of Sweden, a map of stream flow, and so forth. The practical usefulness of stream-regime maps makes it especially important to provide quantitative indices of stream flow and surface runoff.

A comparison of surface-runoff maps shows that the best method of representation on these maps is the method of isolines, with tinting of the space

between isolines in various tones. A greater intensity in tone should correspond to a greater runoff.

The volume of streams is reflected on stream-flow maps. The most suitable and legible method is to color a belt along the streams, with the thickness of the belt corresponding to the quantitative value of the stream flow.

Maps of surface runoff and stream flow are usually based on mean annual data. For most countries, however, it is the seasonal distribution of stream flow and surface runoff that is most interesting. Depending on the practical usefulness of the seasonal data, they can be presented either on separate maps of the mean annual runoff and stream flow. In the latter case, the over-all runoff can be shown by tinting between isolines while the isolines of seasonal runoff can be shown in contrasting colors. Seasonal stream-flow characteristics can be illustrated by graphs placed near the points of observation (as in the atlases of British Columbia and Australia) or elsewhere on the map.

The problem of hydrological indices is also important for atlas maps. Surface-runoff maps in the published national atlases are based on runoff modules (liters per second per square kilometer), the total amount of runoff (in millimeters) and runoff coefficients. The second index is most suitable for atlases because a similar index is used in the compilation of precipitation maps, permitting easy comparison and estimate of the water balance of the given area. For calculation of the first index, an appropriate coefficient can be placed on the runoff maps.

If there is a possibility of increasing the number of maps devoted to the stream regime, a map of hydrologic regionalization should be added. Such maps are found in several national atlases. In this case the selection of the principle of regionalization is important. In the atlas of France, regionalization is based on the dominant source of water supply (glaciers, snow, snow-and-rain, and so forth); in the atlas of Italy, the regional principle is followed (alpine, sub-alpine, Ligurian, and so forth). In the atlas of Leningrad Oblast and the Karelian ASSR, regions are delimited on the basis of the common character of hydrologic processes resulting from the given physical-geographic characteristics, and therefore this particular map of hydrologic regionalization would have been more successful if it had not been schematic and had carried a more detailed legend.

Hydrologic regionalization is designed to distinguish areas that are homogeneous in their hydrologic regime. Therefore regionalization is best based on the principal hydrologic indices relating to the mean annual water balance and the sources of water supply. Secondary characteristics (such as seasonal distribution of surface runoff, the dates of arrival of the hydrologic seasons, floods, freshets, and so forth) can be used to distinguish smaller regional units. An even more detailed breakdown can be based on local features (lake coverage, swampiness, longitudinal stream profile, and so forth) as well as the character of the local water management.

Hydrographic maps and maps of the surface runoff and stream flow are the basic maps of the atlas section on the waters of the land. The specific physical and economic conditions of a country may require the inclusion of additional maps or additional map information. Some of these maps may be of interest to more than one country.

Many national atlases contain maps of lakes that vary considerably in content. For countries with an extensive lake coverage, it is sufficient to include in the atlas a detailed map of lakes compiled from large-scale maps (as in the atlas of Sweden). The origin of the lakes, the quality of the water and other indices can be shown on the map by tinting in various tones, while the depths of lakes can be shown by numbers. If a country has a relatively small number of lakes, there is no need to devote a special map to that subject because the necessary information can be included on the hydrographic map (as in the atlases of Australia and Italy).

It is desirable to include in the atlas maps of the largest lakes, especially if they have economic importance. In such cases the map content would vary with the specific physical geography of the area and the practical purpose of the map (lake-bottom relief, hydrologic regime, chemical composition of the water, water temperature, and so forth).

For many national atlases it is of interest to include data on flooding, especially in countries that are often subject to flooding. The most useful approach is to include a map of possible flooding, as in the atlas of France. On such a map, it is best to show a colored belt along the steams, with the color designating the cause, seasonality or frequency of flooding, and the width of the belt designating the flooded area (at map scale or at an exaggerated scale). The maximum rise of the water level can be designated by numbers at the points of observation. Flood graphs as of specific dates could be placed on the map.

Ground-water maps are of special interest for arid areas. The recommendation is to include in an atlas a hydrogeological map with a complementary map of regionalization based on the ground-water supply for industrial and agricultural purposes. If the atlas has no hydrogeological map, it should include a special ground-water map (as in the atlases of Australia and Lower Saxony). Such a map can provide various kinds of ground-water information depending on practical needs (reserves, quality of water, chemical composition, depth of the ground-water table, accessibility, and so forth). The method of representation can be either regionalization of the area or local representation of ground-water outlets.

An integrated atlas should make it possible to trace easily the main interrelationships between the physical and economic-geographic phenomena of a country. This requires coordination between the various atlas sections in terms of map selection, scale selection, and degree of generalization or detail.

Various maps devoted to waters of the land should be comparable with other maps of the atlas. Representation of the relative drainage density on the hydrographic map should agree with the map of mean annual precipitation and the geological map, and, in the case of arid areas, with the map of seasonal precipitation. In the representation of the type of drainage system and the characteristics of individual streams, the hydrographic map should agree closely with the geological map and the relief maps. The drainage pattern emphasizes the principal features of the land forms, the watersheds and the general dissection of the terrain. The hydrographic map should be compiled at the same scale as the other maps of the physical-geography section.

Maps of surface runoff and stream flow are related most closely to the precipitation maps since comparison of these maps gives a picture of the water balance of the given area. It is therefore important to have a matching selection of maps. If the atlas, for example, contains maps of seasonal runoff, then it should also contain maps of seasonal precipitation. An effort should be made to use identical methods of representation, identical indices and, if possible, an identical degree of detail on both the runoff and precipitation maps. The maps should also be compiled at the same scale.

The compilation of the map of hydrologic regionalization should be closely coordinated with the maps of climate, relief, soils and vegetation. It would be best to compile this map at a smaller, but easily comparable, scale than the other maps of the physical-geography section. Maps of flooding require the inclusion in the atlas of maps or map information relating to the causes of flooding (ice regime, character of snow melting, precipitation, driving winds, earthquakes and so forth).

The hydrologic regime of surface and ground waters is strongly affected by man's economic activity. This is reflected to some extent on the hydrographic maps (reservoirs, canals, and so forth). The utilization of waters is represented more completely in the economic section of the atlas. For a greater tie-in between the physical and economic atlas sections, it is desirable to include in the economic section maps of the multi-purpose utilization of waters, which is especially important for arid areas (as in the atlas of Australia).

Maps of the waters of the land should be placed compactly in national atlases, on two or three atlas sheets, after the section of climate maps.

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PRINCIPLES OF GEOMORPHIC REGIONALIZATION

By V. G. Lebedev

(Abstract: The author proposes a scheme of regional units to be used in geomorphic regionalization. Each rank in the regional scheme is defined in terms of geomorphic processes, with endogenous processes predominating in the case of the higher ranks and exogenous factors prevailing in the lower units.)

Geomorphic research and special geomorphic methods are now finding increasing application in the solution of a number of practical problems. In this connection geomorphic maps are becoming just as necessary as topographic, geological, soils and other maps.

One of the main types of geomorphic maps is maps of geomorphic regions, on which areas are delimited on the basis of individual characteristics. Such maps are usually compiled at small scales and often constitute supplements to ordinary geomorphic maps at larger scales. Like other maps of physical regionalization, these maps are important for planning authorities and design organizations, and also necessary for educational purposes, especially in college teaching. Unfortunately they are still being compiled on the basis of different approaches and through the use of various systems of regional units, which makes it impossible to compare material covering different areas. In this article we will make an attempt to justify a more rational system of geomorphic regional units that was tested in a geomorphic regionalization of China at the Institute of Geography of the Academy of Sciences of the Chinese People's Republic jointly with Chinese geomorphologists.

In attempting a geomorphic regionaliztion of any area we must first establish the regional units of all ranks that are to be used. A. I. Spiridonov has said that geomorphic regionalization of any large section of the earth's crust with complex relief must be done gradually, proceeding from larger units to smaller units, while at the same time refining and detailing the regionalization criteria. Geomorphic regionalization should thus proceed in several stages.

In regionalizing such components of the natural environment as vegetation, soils, animal life, drainage systems, climate and so forth, a major role is attributed to purely geographic laws. But the relief of the earth's surface is formed not only through exogenous forces, but through the direct and significant participation of the earth's internal forces, i.e., processes having no direct connection with geographic laws. The importance of one or the other group of forces in the over-all process of relief formation changes in accordance with the category of forms. I. P. Gerasimov in 1946 offered a definition of the three main categories of geomorphic formations of the earth -- geotecture, morphostructure and morphosculpture. Endogenous forces predominate in the formation of the largest forms (continents, oceanic depressions and the main irregularities within them) while exogenous processes play a subordinate role. Smaller relief categories are formed mainly by exogenous processes. However the character, rate and direction of the exogenous forces is related directly to the tectonic movements of the earth's crust.

The largest units of geomorphic regionalization should therefore be identified on the basis of geostructural features, with gradual superposition of the geographical characteristics that determine the "exogenous coloration" of the endogenous framework, which makes it possible to proceed to a more detailed breakdown of the area. In accordance with these principles, we must select a system of regional units with a strictly defined content.

We consider as most suitable the system proposed by Spiridonov, except that it requires more detailed definition of each rank of geomorphic units and, furthermore, lacks the largest regional unit, equivalent in size and content to the largest structures of the earth's crust, whose distinctive development determines the character of the main geomorphic features of continents and oceanic depressions. These large regional units include entire geosynclinal zones and platforms or their parts, extensive foreland troughs or inner platform troughs, activated parts of platforms, and so forth. We therefore propose to add to Spiridonov's system as the highest taxonomic unit the "geomorphic zone", so that the system takes the following form: (1) geomorphic zone, (2) country, (3) province, (4) oblast, (5) rayon and (6) micro-rayon. If necessary, subprovinces, suboblasts and subrayons can be added. The content of each unit would be as follows.

Geomorphic zone. The Soviet literature contains a number of comprehensive studies on the question of what principles should be followed in the delimitation of the largest geomorphic units. The work of Gerasimov, K. K. Markov and N. I. Nikolayev has been especially valuable. These authors agree that a correct geomorphic regionalization must rest on a geotectonic base. But, according to Nikolayev, some geomorphic regionalizations of the USSR do not take adequate account of the historical-geological principle. He insists that the problem of geomorphic regionalization must be solved by establishing the spatial distribution of complexes of forms that reflect a given course of geological events, while other scholars start only from the two main forms of development of the earth's crust -- the geosynclines and the platforms. In analyzing the relief of the USSR various authors thus arrive at different conclusions. Some

assign the relief of the Urals, central Kazakhstan, Eastern Siberia and other areas to the platform type, and others to the geosynclinal type.

Nikolayev explains this situation by the fact that the definition of the terms "geosyncline" and "platform" often loses sight of the historical aspects of these categories. By now it has been sufficiently demonstrated that evidences of tectonic movements and different geological processes vary both in time and in space.

Furthermore, if we are to understand the genesis of major contemporary forms of the earth's surface, we must solve the problem of the contemporary geotectonic development of the earth's crust. Here we find completely opposite views, especially in the understanding of the tectonic nature of the Asian mountain belt. A. D. Arkhangel'skiy, B. A. Petrushevskiy, V. Ye. Khain, Markov and others regard that belt as a contemporary geosyncline, while many others (G. F. Mirchink, N. M. Strakhov, V. V. Belousov and Nikolayev, see in it a post-platform form of development of the earth's crust.

We know that in the course of their historical development geosynclines were gradually reduced at the expense of expanding platforms and that by the end of the Cenozoic geosynclines changed not only quantitatively but qualitatively and ceased to resemble typical geosynclines. Within the Asian mountain belt, there is now no contemporary geosyncline, but rather a new structural tectonic element of the earth's crust that has transformed the platforms and replaced the geosynclines that have been reduced. There is evidence that this phenomenon began at the end of the Mesozoic.

Different authors have given various names to such sectors. V. A. Obruchev called such a region fold-block mountains, Gerasimov an orogenic zone, Ye. V. Pavlovskiy a region of arcogenesis, Khain resurrected geosynclines, Belousov activated sectors of platforms, Nikolayev regions of contemporary mountain formation corresponding to the post-platform development of the earth's crust. They are distinguished by a predominance of tectonic movements over processes of denudation and accumulation, which leads to a general uplifting and determines the mountainous character of the relief. It should be noted that these movements are for the most part recent. At the same time vast parts of the Alpine platform continue to remain tectonically relatively quiescent sectors of the earth's crust, which leads to the ultimate formation of either a residual denudational relief or huge accumulative plains of the West Siberian type.

Thus, for purposes of geomorphic regionalization, we must take full account of the historical development of various structural forms of the earth's crust, particularly the development of geosynclines and platforms and the appearance of a new geotectonic category -- activated parts of platforms and a whole complex of neotectonic movements. In this connection it is worth giving serious consideration to Nikolayev's suggestion regarding the need for drawing up a separate scheme of tectonic regionalization of the study area as of the end of the Cenozoic to furnish the basis for geomorphic regionalization.

On the basis of the foregoing we think that the geomorphic zone, as the highest unit of geomorphic regionalization, can be d fined as part of a continent or oceanic depression corresponding to the largest Cenozoic tectonic structure of the earth's crust and having a relief that reflects its geotectonic history of development and recent tectonic movements (their direction, intensity and degree of differentiation).

Geomorphic country. This is part of a geomorphic zone having a clearly expressed orographic distinctiveness and a single predominant type of relief over its entire area (mountain system, plateau, plain, depression and so forth) resulting from its history of geotectonic development and the character of neotectonic movements. The main principle of delimiting this regional unit thus remains historical-geological. Here it is extremely important to define the stages of geotectonic development that were decisive in forming the predominant type of relief of the given area. For example, the Tien Shan represents a geomorphic country formed as a result of heavy Himalayan folding on a Variscan basement and which then passed through a long stage of peneplanation and finally was raised to a considerable elevation by recent movements. The Tarim basin is also a geomorphic country having as its foundation a pre-Cambrian massif that was not affected by the Himalayan folding but was subjected to recent tectonic movements. Geomorphic countries within the Soviet Union include the Carpathians, the Crimea, the Caucasus, the Russian Plain, the Urals, the West Siberian Lowland and so forth.

Geomorphic province. Provinces are delimited within a country on the basis of the predominant type of relief formed by one or more relief-forming factors.

In the delimitation of provinces, attention should be focused not so much on similarity in the genesis of the main irregularities of the earth's surface formed as a result of the work of endogenous forces as on similarity in the details of the relief, which are more often than not produced by exogenous processes. In the delimitation of provinces, a leading role thus begins to be played by geographic laws in the form of the climatic factor, which determines the character of the exogenous phenomena.

A good example is the West Siberian Lowland, where climatic characteristics play a well defined part in the processes of formation of the details of the relief (the morphosculptures): ground frost is of decisive significance in the north while arid conditions begin to be evident in the extreme south. The same situation can be observed in the Russian Plain.

Besides climatic characteristics resulting in various kinds of exogenous processes, the delimitation of provinces must also take account of other factors that have decisive influence on the work of exogenous agents. They include the lithological characteristics of large areas (for example, traprock sheets, extensive limestone fields, and so forth), the general character of the geological structures (folded structures, horizontal strata, crystalline

massifs and so forth), the Quaternary history (glaciation, marine transgressions) and details of the neotectonic movements. For example, the Russian Plain, which as a whole constitutes a geomorphic country, can be divided into several provinces. In the northwest is a province of tectonically denuded, dissected upland plains covering Karelia and the Kola Peninsula. Farther south is a province of glaciated, hilly and level plains, which in turn falls into two subprovinces: (a) one with glaciated relief forms dating from the Valday glaciation (corresponding to the Würm stage -- Editor, S. G.) and (b) another with glaciated relief forms dating from the Dnieper glaciation (corresponding to the Riss stage -- Editor, S. G.). Still farther south is a province of glacial outwash and alluvial plains alternating with upland plains that have been heavily dissected by erosion. Finally, in the extreme south, is a province of marine accumulative plains. This complex, but at the same time rather clearly defined zonal picture results mainly from the work of the continental ice sheets, stream erosion and marine transgressions, primarily in Quaternary times.

One more example may be cited. In the Tarim Basin we must apparently distinguish along the margins a separate province of talus material related to the orography of the near-by mountains and the aridity of the climate. But is this talus belt to be considered a province or an oblast? That question requires more detailed study of the basin as a whole. The point is that in some cases the geomorphic country can be divided directly into oblasts because it contains only one geomorphic province.

Geomorphic oblast. This is part of the geomorphic province, and in some cases of the geomorphic country, representing an areal unit within which the relief is relatively homogeneous both in genesis and morphology.

In delimiting geomorphic oblasts, use should be made as far as possible of the greatest number of factors that produced the relief within the given regional unit; in other words, regionalization should be based on an integrated approach. These factors include: the lithological-structural characteristics of the bedrock, the structure and history of formation of the superficial Meso-Cenozoic mantle, recent tectonics, external characteristics of the relief, the genesis of forms, the history of formation and the geological age of the relief, and contemporary geomorphic processes.

Geomorphic rayon. This is part of the geomorphic oblast possessing the simplest combination of a constant number of forms over its entire area. In the simplest case only one or two forms may be represented. The appearance of a new form would then designate the area of another rayon.

An example of a geomorphic rayon in a plain is the floor of a broad valley with a system of low alluvial terraces or the long slopes extending from the valley to the watershed plateau with remains of older terraces. An example of a geomorphic rayon in mountains is the highest part of a mountain range with a constant combination of glaciated mountain forms or the slopes of the mountain range.

Rayons can be delimited only after thorough study of the oblast territory and such delimitation is technically feasible only at larger scales. In even more detailed research it is possible to delimit micro-rayons on the basis of the details of the morphology (sizes, orientation and so forth) and the characteristics of microforms and of contemporary exogenous processes.

THE OBJECTIVE BASIS OF ECONOMIC REGIONALIZATION AND ITS LONG-RANGE PROSPECTS

By P. M. Alampiyev

(From the book Voprosy razmeshcheniya proizvodstva i ekonomicheskogo rayonirovaniya (Problems of the Location of Production and Economic Regionalization), Moscow: Gosplanizdat, 1960, pp. 239-53).

(Abstract: The author defends the objective existence of regions as opposed to the subjective concept prevalent in the West. He sees the unity of an economic region in its economic specialization and its internal economic relations. In his view, analysis of these relations is required to work out a system of regions, and in view of the complexity of economic relations, several variants of regionalization are possible.)

Among the principal problems of the theory of economic regionalization is the question of the objective existence of economic regions.

Obviously the problem is not whether there exist objectively, independently of our perception, localities forming a region, with productive forces operating in the given area and with a distinctive production in each region. This point is entirely clear.

The content of the question posed above is quite different. Does there actually exist in reality an economic unity within a region, making it possible to regard the economic region as an organic whole, representing a separate category differing qualitatively from other economic phenomena? (We are talking here only about integrated, synthetic economic regions, leaving aside the question of regions within a given industry or branch of agriculture.)

There are two points of view with regard to that question. One acknowledges the objective existence of the economic unity of a region, the other denies it.

Acknowledgment of the objective existence of regional unity means at the same time to acknowledge the objective laws of the origin, formation and development of economic regions. These laws can be studied and in accordance with them we can scientifically define, with a certain degree of accuracy, the actual boundaries of regions, grasp the trend of development inherent in the given regions, and thus forecast their future course of development. To

acknowledge the objective existence of economic unity in regions means to acknowledge the possibility of affecting their course of development under conditions of a planned economy, to promote actively any progressive tendencies in that development and to eliminate the influence of negative tendencies.

This point of view is opposed by the one that rejects the objective existence of regions, holding that an economic region is only an arbitrary, intellectual construction. Regionalization, in that case, is simply a systematic method, one of the ways of arranging and organizing a body of scattered, diverse, unrelated factual data in the field of location of productive forces with a view to facilitating research or teaching. In this process the number of variations of possible regional schemes increases to infinity since everything depends on the purposes of the researcher and on the criteria and their combinations used in each given case as the basis for regionalization.

Disputes between adherents of the two points of view are of concern not only to science but also to the practice of economic planning because one or the other solution of this problem determines the organization and method of economic regionalization and its concrete results.

The first point of view, acknowledging the objective basis of economic regionalization, derives from the laws of the objective development of society. Both the territorial social division of labor and the formation of economic regions are objective processes taking place independently of the will and awareness of people. The actual processes taking place in the field of economics are reflected and grasped through research. Since territorial economic unities arise and are formed according to objective laws in the course of the country's economic development, research work in this field involves mainly the uncovering, the finding of these economic unities in actual reality and to bring them, if possible, even closer to reality, to define their boundaries and trends of development, to uncover the laws guiding the course of that development, to determine the possibilities of using these laws in practical economic construction and to equip the field of practical applications with a thorough knowledge of the processes of development of regions in general and each region in particular.

The second point of view, which assigns to regionalization the role of a systematic method yielding arbitrary schemes constructed on the basis of subjectively selected criteria and indices, derives from the will of the investigator and is idealistic in concept. It denies, in effect, the scientific character of economic regionalization on the ground that arbitrary, subjective decisions of individual investigators cannot constitute the content of economics or any other science. Moreover, these subjective opinions cannot be verified scientifically.

The materialistic concept of the economic region is characteristic of Soviet economic geography and the economic geography of the people's democracies. It derives logically from the basic tenets of Marxism-Leninism

and from the materialistic concept of the economic life of society. There can, of course, be individual partisans of the idealistic concepts among the geographers of the Soviet Union and the people's democracies, but they do not determine the basic trend of economic geography in Socialist countries.

These idealistic concepts of economic regionalization are widespread among economists and especially among geographers of the capitalist countries. These idealistic views were also found in Tsarist Russia among some investigators concerned with general and agricultural regionalization.

These views are now widely accepted among geographers of the United States. They have been stated most clearly in the book American Geography, Inventory and Prospect. This collective work, reflecting the views of leading American geographers and representing the official geographic science of the United States, denies the objective existence of economic regions. It regards the region as an intellectual construction designed to facilitate the work of the investigator or teacher.

According to the authors of that book, "a region is not an object, either self-determined or nature-given. It is an intellectual concept, an entity for the purposes of thought, created by the selection of certain features that are relevant to an areal interest or problem and by the disregard of all features that are considered to be irrelevant" (Amerikanskaya geografiya, sovremennoye sostoyaniye i perspektivy (American Geography, Inventory and Prospect), Russian edition, Moscow, 1957, p. 47).

From that point of view, regionalization is nothing but simply a systematic method, whose value is determined by the investigator's own convenience (op. cit., p. 30).

Such a point of view is not compatible with science. If the region exists only in the investigator's imagination and is merely the fruit of his thinking rather than a reflection of life and reality, then regionalization should be effected not through the study of life but on a completely subjective basis. This view is echoed by some American bourgeois scholars who hold that a scientific theory is not a reflection of life but merely a "line of conduct for scholars."

Naturally, not all bourgeois scholars by far support the position of extreme subjectivism in matters of economic regionalization. There are more realistic views regarding the economic region, especially among economists who are concerned with the problem of unemployment, the business situation and its characteristics in various regions. Whenever research into economic regions is linked directly with the practical activities of business groups, the schematic, subjective concepts of economic regionaliztion are replaced by views that correspond more to reality.

Marxist economic thought regarded economic regions as objectively real phenomena even in Tsarist Russia.

V. I. Lenin in his very first literary work, "New economic trends in peasant life," emphasized the importance of the regional approach to study of the economy. Lenin pointed out the error of combining in statistics data relating "to different economic regions with different economic conditions." He said it would be preferable "to combine zemstvo (minor civil division) statistics for a certain region having homogeneous economic conditions" (V. I. Lenin, Soch. (Works), Vol. 1, p.4). He based his concept of a region mainly on the unity and homogeneity of the economic conditions under which the regional economy was developing.

In his classic study "The development of capitalism in Russia," analyzing the origin and development of economic regions in the post-reform period (the period after the abolition of serfdom in 1861), Lenin demonstrated that the formation of industry and commercial agriculture was an objective process resulting from a growth of the social division of labor together with the development of capitalist productive relationships in Russia.

On the basis of deep analysis of the process of development of capitalism as a whole and its distinctive manifestations in various parts of the country, Lenin delimited the regions formed by that time by using a closely reasoned methodology. He selected for analysis in each individual case those indicators that reflected most fully and clearly the process of formation of the given region as a component part of the over-all process of development of capitalist relationships in the country. Lenin's method of delimiting regions thus differed fundamentally from subjective regionalization based on arbitrary selection of certain statistical criteria or combinations of criteria and their mechanical application by bourgeois scholars who did not probe into the essence of economic processes and did not go beyond superficial operations with statistical and other indicators.

Lenin's delimitation of regions serves as a model for the Marxist approach to the problem of economic regions. He regarded the economic unity within a certain area delimited as a region not as an arbitrary intellectual construction but as objective reality existing independently of the will of the investigator. The formation in Tsarist Russia of industrial and agrarian regions, of regions of the metropolitan type and of the outlying colonial type, and of regions specializing in the production of various commodities was an objective process, flowing directly from the development of capitalism.

Soviet Marxist economic geography derived and continues to derive from the materialistic concept of the economic region. In the economic regionalization work of the Gosplan (State Planning Commission) in 1921-22, the region was consistently regarded as an actually existing territorial economic unity whose development under Soviet conditions is heavily influenced by governmental action and is directed by an economic plan based on thorough study of actual conditions. The Gosplan's report to the third session of the All-Union Central Executive Committee (the predecessor of the Supreme Soviet) stated that "an economic region claiming an independent existence as an integrated economic organism (provided, of course, that it maintains

economic relations with other similar regions) can be delimited only after careful investigation of all factors of its economic life: natural-historical resources, the density and distribution of population, the region's industrial and technical resources, its transportation facilities and the location of its economic centers" (Ekonomicheskoye rayonirovaniye Rossii. Doklad Gosplana III sessii VTsIK (Economic Regionalization of Russia. Report of Gosplan to the Third Session of the All-Union Central Executive Committee), Moscow, 1922, p. 6).

The idea of a formalistic-statistical method of regionalization was alien to Gosplan and it rejected a method, proposed by some specialists, for superimposing a system of purely statistical regionalization schemes, each based on a single criterion. A region is not simply the sum of various factors, but a single economic whole, and the interrelationships between factors can be determined only by studying their mutual influence in the process of dynamic development of the national economy (op. cit., p. 12).

The economic region was thus invariably regarded by Gosplan as a large integrated economic system, and not as a homogeneous area delimited artificially on the basis of arbitrarily selected statistical indicators.

The traditions of Gosplan regionalization were firmly adopted by Soviet economic geography. It was generally acknowledged that economic geography deals with actual processes taking place in the country's economic life. Economic regions are not the fruit of the imagination of office scholars, but a reflection of the objective phenomena of reality and of the country's economic life that arise independently of the will and consciousness of investigators.

The unity of an economic region lies in its economic specialization and its internal economic relations. In a Socialist planned economy it is the state that takes the processes of regional formation and development under its control. Economic geography and economic planning seek to determine the most rational ways for the formation and the normal development of a system of economic regions, and to prevent disproportions and gaps in the development of the branches of production both within the economic regions and in inter-regional relations.

A scientifically grounded and well organized system of economic regions thus acquires great importance. Hence the need for studying the objective economic relations, both inter-regional and intra-regional, to insure a correct, scientifically grounded regionalization of the country and the use of regionalization as a powerful lever of economic development of the country as a whole and its parts.

The problem of identifying and analyzing the economic relations that serve as the basis for economic regions is a very complex one. The point is that these relations vary in different branches of production, are of

different magnitudes in different regions and segments of the economy, overlap and under conditions of a highly complicated territorial division of labor form an unusually complex fabric on the economic map of the country.

Under actual conditions there is almost never a break in economic relations at the boundaries of regions. Transitions between regions are diffuse and unclear.

In addition there is a need for a long-range and constructive approach to regionalization, i.e., a need for determining not only what has already clearly taken shape, but also what is in the process of formation or even exists only potentially and needs to be supported by capital investments and other measures as something economically rational. This explains the whole complexity of working out a scientific system of economic regions in a Socialist country.

By delimiting economic regions and creating a "network" of economic regions, we always disturb with any boundary we draw the vital relations between neighboring localities situated on both sides of the given boundary since the fabric of economic links in the country is a continuous one.

Any network of economic regions has this effect. It is organically unable to reflect in its entirety the complexity of spatial relationships in production. It is obvious that a completely adequate network of regions and objectively existing system of economic relationship can hardly be achieved. Economic regionalization can encompass only the most essential, the important, the basic aspects of the country's territorial-economic relationships, leaving aside secondary, complicating factors which can be neglected in determining the main territorial differences within the economy and the vitally important economic links within the region and between regions.

In that respect there is a substantial difference between the economic unity of the region and the economic unity of the country. The latter has strictly defined limits -- the state boundaries -- which constitute economic boundaries because of the existence of a system of customs duties, differences in the conditions of economic activities on both sides of the border, differences in the legislation of various countries, different currencies and so forth. Within the state boundaries takes place the development of a national market. Economic regions do not have such sharp economic boundaries.

Occasionally we find a simplified formulation of the problem of economic regionalization in which the principle of the objective basis of economic regionalization is incorrectly applied.

The chain of reasoning in this case is as follows. If economic regionalization is not an arbitrary, subjective decision of the investigator but derives from objective reality, then we must look for economic regions in actual life. The entire work of the investigator is then reduced to finding these regions.

If these regions objectively exist, then their relationships and a system must also exist. Consequently there also exists objectively a "network of regions," which means that there is no need for creating such a network; it simply has to be found in actual reality.

Some investigators confuse economic regionalization with the location of production. N. N. Kolosovskiy in some of his studies identified the objective existence of regions with regionalization (N. N. Kolosovskiy, Osnovy ekonomicheskogo rayonirovaniya (Principles of Economic Regionalization), Moscow, 1958, pp. 94, 182-83). He wrote that "speak of the location of productive forces means to speak of regionalization" and that "the task of geographers is to uncover the actual course of regionalization" (O. Kibal'chich and M. Stepanov, "Discussion of the scientific problems of the economic regionalization office," Vestnik MGU, 1953, No. 9, p. 167).

This error is repeated by I. I. Belousov, who says that "economic regionalization is a social-historical process based on objective laws. Productive forces, which are coordinate with productive relationships, have the property of forming geographically localized groupings, which are the economic regions" (I. I. Belousov, "On the role of transportation in economic regionalization," Voprosy ekonomiki pishchevoy promyshlennosti (Problems in the Economics of the Food Industry), Trudy MTIPP, (Papers of the Moscow Technological Institute of the Food Industry), No. 7, Moscow, 1957, p. 320).

In reality economic regionalization reflects objective processes in the economy but is not identical with those processes.

Related to this question is the problem of the possibility of different solutions in regionalization. I. G. Aleksandrov, noted theoretician of Soviet economic regionalization, once declared categorically that Soviet scientific regionalization does not allow differences in solutions "and if there is in fact a possibility of different solutions, then it is always the result of inadequate knowledge of the elements of the problem. If all the facts are known and we take a fully rationalistic approach to the problem, there can be only one real solution" (I. G. Aleksandrov, Osnovy khozyaystvennogo rayonirovaniya SSSR (Principles of Economic Regionalization of the USSR), Moscow, 1924, p. 5).

In reality the situation is quite different. The territorial production links that exist in reality are very complex and of various scales, and a great deal of analytical work is required to gain an understanding of these interwoven economic links and to work out a network of economic regions. What exists under actual conditions is only the objective basis for economic regionalization, and economic regionalization itself must be the result of scientific analysis of that basis. Economic regionalization is part of the field of science, planning, and economic policy. It has already been noted in the Soviet economic-geographic literature that regionalization, as a tool of economic policy of the Communist party and the Soviet regime based on the perception and utilization of its objective basis, cannot be equated with

that objective basis (A. S. Vetrov, "Problems in the theory of economic regionalization," Uchenyye zapiski Chkalovskogo Gosudarstvennogo pedagogicheskogo instituta, seriya yestestvenno-geograficheskikh nauk (Scholarly Papers of the Chkalov State Pedagogic Institute, series of the natural and geographic sciences), Chkalov, 1957, p. 13).

Regionalization may sometimes incompletely and not quite correctly reflect actual conditions; it may lag behind or anticipate; it may involve errors and gaps; after all, complex economic phenomena are not interpreted so easily.

The higher the level reached by economic science and the more perfected the scientific methodology of regionalization becomes, the greater the chances of a more correct interpretation of objective reality.

But even when the existing system of territorial economic relations is properly interpreted, different courses and rates of regional development are possible depending on the decisions adopted by the state. And the latter are motivated by general political and economic factors, the needs and the potentialities of the national economy as a whole, the international situation, and the constantly renewed political and economic objectives that the country faces at each stage of Communist construction.

In economic reality there is no ready-made network of regions although there are actually existing territorial production complexes. But these complexes are of varying sizes and overlap one another; the elements of one complex may extend onto the territory of location of another complex, and there are transitional zones.

A multitude of controversial problems arises in the analysis of such extremely complex systems of economic links existing under actual conditions, and the working out of a regional network may have several possible solutions, several variants. Hence all the difficulties of economic regionalization. Hence the usual arguments about the number of regions, their composition and their boundaries. It is at this point that subjective decisions are introduced into problems that would seem to be solved beforehand by the objective course of development of the country and its parts.

In regionalization, as in long-range planning, there is no guarantee against errors deriving from a one-sided understanding of actual conditions and from miscalculations. If such errors are committed, sooner or later the course of events will disclose these errors and call for correction. In the meantime, of course, an incorrect regionalization means excessive expenditure of forces and funds and unused potentialities of speeding the rate of economic development or economizing social labor compared with what could have been done with a more correct regionalization.

The introduction of science and economic policy into the processes of formation and development of territorial production units does not eliminate the effect of the objective laws that guide the development of these processes.

But science and a scientific economic policy based on perception of these laws can help to improve the territorial organization and planning of production, give full play to the more progressive tendencies, and guide the tendencies evident in the development of territorial economic links into a channel required by a Socialist society.

Acknowledgment of an objectively existing basis for economic regionalization does not contradict the long-range character of Socialist economic regionalization. We should be able to see objective reality not only in what stares us in the face, but also in what is just beginning to come into being and is being envisaged by a scientifically grounded plan. We tend to lose the objective base and to depart from actual conditions not only when we fail to investigate thoroughly the existing economic links and location of productive forces, but also when we restrict ourselves to the past and fail to look ahead to what will be the reality of tomorrow. We must take care, of course, not to slide into a position of voluntarism.

(This was already mentioned by N. N. Kolosovskiy: "... The introduction into science of an estimate of the prospects of regional development is entirely acceptable in principle without danger of disturbing the objective character of scientific research because, under the Soviet system, a plan for economic development, having been constructed on a scientific basis and being supported by the masses and executed by a centralized economic apparatus organized along governmental lines, becomes an objective force. Therefore, once we know the general laws of Socialist development, we can also guide the process of formation of economic regions" (N. N. Kolosovskiy, "The territorial-production combination (complex) in Soviet economic geography," Voprosy geografii, No. 6, 1947).)

The best solution of this problem is to follow the principle formulated by our Chinese comrades: "Start from the present, look into the future." Explaining that principle, Wang Shou-li wrote: "Regionalization is long-range in character; its main objective is to point out the direction to be taken by the economic region and the prospects of development of each economic region. These prospects must not be regarded as something remote. Therefore one must not lose touch with present reality or with the concrete situation existing at the present time because the prospect and direction of economic development of all regions is based on their present levels" (Wang Shou-li, "On the principles of economic regionalization within provinces," Ching-chi Yen-chiu (Economic Research), 1958, No. 1, translated by VINITI, p. 9-10).

Governmental direction of the economy, conscious participation of the working people in economic management, and economic planning are in no way opposed to objective economic laws. A scientifically grounded plan is based on thorough knowledge of objective reality. The economic plans of the USSR are therefore true to life and the goals envisaged by the plan are, as a rule, realized. The development of economic regions proceeds in accordance with the plans, which foresee the course of that development and regulate

the process. This is an example of conscious direction of the economic life under conditions of socialism. Planning does not prevent the development of regions from being an objective process.

Scientifically grounded long-range planning of regions, based on the existing situation and taking account of the requirements of the economic laws of socialism, in turn actively affects the objective process of formation of regions. The working out of a network of economic regions and of the hypotheses of development of each region is thus of tremendous importance for the location of production and the future development of all regions in the country.

Any problem relating to the economic regionalization of a Socialist country must be examined from two points of view: first, from the point of view of the present state of the economy, and second, from the point of view of the prospects of economic development and the achievement of economic objectives envisaged over more or less long periods.

Proper economic regionalization is unthinkable without consideration of the prospects of economic development of a Socialist country because the formation of economic links within and between regions takes place over a long period of time. Proper location of production is unthinkable without consideration of the prospects of development of new mineral deposits and hydroelectric resources, the creation of new industrial nodes, the construction of new transport lines, the progress of technology and so forth. Economic regionalization cannot fulfill its function, which is to promote the proper formation of territorial production complexes, if it does not look ahead. The long-range view is especially important for such areas as Eastern Siberia, where huge new territories and new natural resources are being developed for the first time.

For proper planning of the national economy there must be a long-range hypothesis of development of major economic-geographic regions, in the absence of which there are inevitably discrepancies between segments of the economy and between completions of construction projects and regional needs, as well as disparities within the economy and irrational hauls.

The network of economic regions and the hypotheses of development of each region must be based on over-all national objectives. We cannot allow the existence of a one-sided, narrowly provincial concept of the prospects of development of a given region, based exclusively on a striving for maximum development of the potential of the given region without consideration for the needs and potentialities of the country as a whole.

The over-all balance of production and consumption of a given commodity, especially in extractive industries, may dictate the need for utilizing less economical enterprises and production points and drawing new natural resources into economic circulation, or, on the other hand, the need for abandoning the pattern of production that existed up to that time.

One of the principal elements in long-range economic regionalization should be the factor of technical progress, and the related possibilities of using new types of raw materials and energy, new types of transport and so forth. Technical progress has a substantial effect on specialization and on integral regional development, on proper proportions between segments of the regional economy, on proper inter-regional proportions, on the character, intensity and geographical distribution of economic links, and so forth. That effect is not limited to the utilization of new types of products and new sources of material riches. Equally important for the location of production, and consequently for regionalization, are changes in such economic indicators as production costs, etc. Under new conditions it may become uneconomical to continue the extraction of certain types of fuel or raw materials in some regions and it may, on the other hand, be economical to develop in other regions those commodities that earlier had been uneconomical to produce.

The prospects of transport development may also dictate changes in the composition and boundaries of regions. That is especially true of newly developed regions where the construction of, say, a new railroad may completely change the direction of the economic links, the economic gravitation and the specialization of a region and thus introduce new factors into economic regionalization.

Also important for economic regionalization are the prospects of uncovering and exploiting new natural resources, which may have a substantial effect on the specialization of regions and inter-regional links.

The long-range character of economic regionalization should be restricted within a definite framework. A regional network would be entirely unsatisfactory if it envisages some regions as they are at the present time, others as they may look in 1980 and still others as they may look in the year 2000. A single time period should be selected for the entire regional network, and that time period should be foreseeable because excessively long-range regionalization (looking tens of years ahead) involves so much uncertainty in the basic plan indices that economic regionalization loses its firm foundation and turns into uncertain guesswork.

Not all types of economic regionalization must take identical account of the prospects of economic development. While, for example, general economic regionalization, which is required above all for long-range planning, can be carried out only on the basis of the long-range prospects of economic development, economic administrative regionalization, dealing mainly with the management of the national economy, must be based primarily on the present state and the short-range prospects of economic development.

ON THE OBJECTIVE AND THE SUBJECTIVE CHARACTER OF ECONOMIC REGIONALIZATION

(regarding the article by P. M. Alampiyev)

By Yu. G. Saushkin

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1961, No.2, pp. 56-61)

(Abstract: The author takes issue with the preceding article on the question of the objective basis for regionalization. Saushkin maintains that the unity of economic regions is not derived from their internal economic relations, as Alampiyev puts it, but from the existence of what Saushkin terms "territorial complexes of productive forces." Saushkin asserts that a single objective system of regions exists in reality and that it is the task of science to uncover that system. Saushkin says Alampiyev's suggestion that there may be several variants of regionalization smacks of the Western subjective approach to regionalization.)

At a special symposium on economic regionalization of the USSR at the Third Congress of the Geographical Society USSR in Kiev in 1960, Soviet economic geographers and some foreign scholars thoroughly discussed the theoretical and practical aspects of economic regionalization, which has assumed great importance both in the USSR and in some other countries. (The papers prepared for that symposium were published in Soviet Geography, 1960, pp. 50-60; September 1960, pp. 28-59; October 1960, pp. 3-32.) The resolution of the congress, after discussion of the papers on contemporary principles of economic regionalization and concrete networks of economic regionalization in the USSR, stated: "To consider that in case of differences between proposals for economic regionalization of the USSR, one must proceed from the principles of the objective existence of regions, consideration of the prospects, national specialization (the region as a link in the national division of labor) and integral development of regions, technical progress, the maximum productivity of social labor and consideration of the ethnic factor (Soviet Geography, January 1961, p. 68).

The principle of the objective existence of regions is a basic principle of the Marxist-Leninist theory of economic regionalization that Americans, Britons and other foreign scholars try to refute in their geographical and economic literature, at scientific congresses, symposia, seminars and so forth. It was therefore no accident that speakers of the Third Congress of the Geographical Society USSR, though supporting different points of view on several questions of principle, have published simultaneously and independently of each other two articles on the same topic: the objective existence of regions (P. M. Alampiyev, "On the objective basis of economic regionalization and its long-range prospects," in the book Voprosy razmeshcheniya proizvodstva i ekonomicheskogo rayonirovaniya (Problems of the Location of Production and Economic Regionalization), Moscow: Gosplanizdat, 1960, pp.239-53;

translated in this issue of Soviet Geography, pp. 68-71). Subsequent references are to the pagination in this issue. -- Yu. G. Saushkin, "Some methodological problems of regionalization," in the book Filosofskiye problemy yestestvoznaniya, vyp. 3. Geologo-geograficheskiye nauki (Philosophical Problems in the Natural Sciences, No. 3. The Geological-geographical Sciences), Moscow University, 1960, pp. 389-402). The two authors (Alampiyev and Saushkin), starting from the premise of the objective existence of economic regions (and of integral regions in general), criticized the subjective, idealistic concept of regionalization expounded in the book American Geography, Inventory and Prospect (Russian edition, Moscow, 1957). One would think that there would be occasion for rejoicing at the unanimity of two economic geographers who differed on several substantial problems in Kiev at the Geographical Congress. Unfortunately, however, Alampiyev after beginning his article on the right track then makes several statements that go directly against the principle of the objective existence of regions and, whether he wants it or not, lead toward the concept of subjective economic regionalization.

Alampiyev states correctly that an economic region is not simply the sum of various factors but a single economic whole, a large integrated economic system, a reflection of objective phenomena in the country's economic development that take place independently of the will and consciousness of investigators (Alampiyev, op. cit ., p. 68 in this issue of Soviet Geography). But of what does regional unity consist and how is it measured? Alampiyev replies as follows: "The unity of an economic region lies in its economic specialization and its internal economic relations" (Alampiyev, p. 68). But that is clearly inadequate for scientific grounding of an objectively existing economic region. The report of the Gosplan to the Third Session of the All-Union Central Executive Committee (1922) stated quite correctly that a region can be delimited only after investigation of its natural resources, the density and distribution of its population, its industrial and technical resources, its transportation facilities and the location of its economic centers (Voprosy ekonomicheskogo rayonirovaniya SSSR (Problems of the Economic Regionalization of the USSR), G. M. Krzhizhanovskiy, editor; Gospolitizdat, Moscow, 1957, p. 127). Alampiyev is well aware of this; moreover, he cites the corresponding paragraph of the report, but does not follow the course dictated to Soviet economic geography by that remarkable document. That report clearly states that the unity and integrity of a region are conditioned by the combination of its natural resources and productive forces, which in turn insure its development and national specialization. An economic region is an area with a law-governed combination (complex) of productive forces. The development of the regional territorial complex of productive forces is the basis of the objective process of growth and increasing complexity of the structure of the economic region, the development of the region's national specialization, and its internal and external economic relations. Alampiyev by-passes this objective basis of the formation and development of regions and goes on directly to its consequence. It is the latter that he makes pass for the basis of regional development when he writes that it is the economic relations that serve as the criterion for

economic regionalization (Alampiyev, p. 68). Why did the author find it necessary to do so? In order to point up the complex nature of identifying and analyzing the economic relations, which "vary in different branches of production, are of different magnitudes in different regions and segments of the economy, overlap and under conditions of a highly complicated territorial division of labor form an unusually complex fabric on the economic map of the country" (Alampiyev, p. 68). Alampiyev holds that since there are no breaks in economic relations at regional boundaries, the transitions between regions are diffuse and unclear, and that in the creation of a "network" of economic regions the regional boundaries always disturb "the vital relations between neighboring localities" (Alampiyev, p. 69). In other words, wherever we might draw regional boundaries, such boundaries are to a certain extent artificial and the regions (in the sense of systems of economic relations rather than territorial complexes of productive forces) are incognizable and arbitrary. The author then says: "It is obvious that a completely adequate network of regions and objectively existing system of economic relationships can hardly be achieved (Alampiyev, p. 69). And what degree of adequacy can be achieved? To what extent can a system of economic relations, whose indefiniteness is acknowledged by the author, serve as a basis for delimiting objectively existing economic regions? Unfortunately, Alampiyev is silent on these points.

We know that the economic relations of Soviet enterprises change considerably with time. They have, for example, changed to a large extent in recent years as centralized, ministerial management of industry and construction was replaced by territorial management based on economic administrative regions. But the system of objectively existing major economic or economic-geographic regions has not changed. Alampiyev is correct in writing that regionalization must grasp the essential and the basic and leave secondary factors aside (Alampiyev, p. 69). But if regionalization is to be based on the main economic relationships, it must be borne in mind that precisely the most distant, the most ramified, intercrossing and complex economic relations are characteristic of the largest enterprises of national significance that determine the regional specialization. It is precisely these relationships of the nation-wide territorial division of labor that cannot be "cut" by regional boundaries, but it is on them that Alampiyev wishes to base economic regionalization. In short, first, he selects economic relations as the basis for regionalization, then he talks about their complexity and incognizability, and then he concludes that the regional network cannot completely reflect systems of economic relations, in other words, it turns out that the regional network is to a large extent arbitrary. It should be recalled in that connection that the report of the Gosplan to the Third Session of the All-Union Central Executive Committee resolutely rejected the method of economic regionalization "based on relations" (Voprosy..., p. 117).

Having sown doubt regarding the objective existence of regions, Alampiyev goes over to the attack and criticizes the work of N. N. Kolosovskiy (Osnovy ekonomicheskogo rayonirovaniya (Principles of Economic Regionalization), Moscow, Gospolitizdat, 1958) and of I. I. Belousov ("On the role of transportation

in economic regionalization," Voprosy ekonomiki pishchevoy promyshlennosti (Problems in the Economics of the Food Industry), Trudy MTIPP (Papers of the Moscow Technological Institute of the Food Industry), No. 7, 1957) for a "simplified" formulation of the problem of economic regionalization and for incorrect application of the principle regarding the objective basis of regionalization (Alampiyev, p. 69). Alampiyev presents their views as follows: "If economic regionalization is not an arbitrary, subjective decision of the investigator but derives from objective reality, then we must look for economic regions in actual life. The entire work of the investigator is then reduced to finding these regions. If these regions objectively exist, then their relationships and a system must also exist. Consequently there also exists objectively a "network of regions," which means that there is no need for creating such a network; it simply has to be found in actual reality" (Alampiyev, p. 69). It should be noted that at the beginning of his article Alampiyev correctly stated the Soviet point of view acknowledging the objective basis of economic regionalization: "Since territorial economic unities arise and are formed according to objective laws in the course of the country's economic development, research work in this field involves mainly the uncovering, the finding of these economic unities in actual reality and to bring them, if possible, even closer to reality"(Alampiyev, p. 70). (Italics added by Saushkin.) Why now, suddenly, do the uncovering of economic regions in real life and the establishment of the objective existence of regions cease to be a creative endeavor and become a "simplification"? Because the logic of Alampiyev's reasoning leads him further and further away from the "credo" of Soviet science that he himself stated correctly at the beginning of his article.

Alampiyev decides to contrapose the objective existence of regions to the creative scholarly process of economic regionalization. But, when Newton established the law of gravitation, did he not "simply discover" that the apple fell to earth; did not physicists who formulated contemporary atomic theory "simply discover" atoms in actual reality? The same applies to economic regionalization: the discovery of such a complex phenomenon as an economic region is a difficult and creative endeavor in the highest degree. The "discovery" of a region means investigating its complex of productive forces, the relationships between that complex and the region's physical geography and natural resources, the structure of the economy and its internal production relationships, and inter-regional economic relations, as well as establishing the prospects of development. Only after we know all that, can we correctly draw the regional boundaries and "discover" the region for purposes of scientific research and practical applications. Alampiyev concludes that "in reality economic regionalization reflects objective processes in the economy but is not identical with those processes" and "what exists under actual conditions is only the objective basis for economic regionalization (note that it is no longer the objectively existing regions -- Yu. Saushkin), and economic regionalization itself must be the result of scientific analysis of that basis" (Alampiyev, p. 70). We know that reality can be distorted, but in that case it is difficult to talk about identicalness. It is obvious that regionalization should as completely as possible and as identically as possible

uncover the actually existing system of economic regions of the country. Of course, while a thorough, comprehensive study of reality and the establishment of a network of economic regions are under way, reality itself changes to a certain extent, but the system of regions does not change at the same speed as, for example, the economic relations of enterprises, their economic life, and so forth. It is quite true that economic regionalization must be the result of the scientific analysis of objective reality, but why should it not or could it not uncover correctly, as closely as possible to reality, the actually existing economic regions of the country?

The question of the interrelationships between actual reality and materialistic science has been sufficiently clarified by Marxist-Leninist theory and practice, and that includes the question of the scientific process of economic regionalization of the country. The task of science, as Alampiyev correctly states at the beginning of his article, is "the uncovering, the finding of these economic unities (regions) in actual reality and to bring them, if possible, even closer to reality, to define their boundaries and trends of development, to determine the possibilities of using these laws to uncover the laws guiding the course of that development, to determine the possibilities of using these laws in practical economic construction and to equip the field of practical applications with a thorough knowledge of the processes of development of regions in general and each region in particular" (Alampiyev, p. 70). In other words, the scientific process of regionalization should perceive as fully as possible the objectively existing regions and place the laws of regionalization at the service of practical application.

Alampiyev attacks the point of view of Academician I. G. Aleksandrov, who held that if all the facts are known and a rational approach is taken to the problem, there can be only one real solution of the economic regionalization of the country (with as complete as possible an approximation of actual reality). Alampiyev counters with the view that different solutions in regionalization are possible (Alampiyev, p. 70). He emphasizes that regionalization may sometimes incompletely and not quite correctly reflect actual conditions, and that errors and gaps are possible. Of course, errors are possible in any endeavor, but they do not determine the methodology of regionalization and the principle of inevitability of dual solutions. Alampiyev somehow feels that his allusion to the possibility of error is not convincing and goes on fully to disclose his ideas, which are essentially the ideas of subjective regionalization: "But even when the existing system of territorial economic relations is properly interpreted, different courses and rates of regional development are possible depending on the decisions adopted by the state" (Alampiyev, p. 71). And that is precisely the point: economic regionalization can in no way be construed as an "interpretation" of territorial economic relations. If that were the case, then, in the first place, it would be possible to have as many regions as there are "interpreters" since the rapidly changing economic relations are complexly intertwined with one another. Secondly, the economic decisions taken by the state to a very large extent change the territorial economic relations (suffice it to mention the change-over from the centralized to the regional system of industrial

management, the change in freight rates, and so forth). But that does not result in any rapid change in the system of major economic regions and certainly does not give rise to any "duality" in courses of development of that system in view of the fact that a single, scientifically grounded course is selected.

Alampiyev is wrong to an even greater extent when he writes that "in economic reality there is no ready-made network of regions although there are actually existing territorial production complexes. But these complexes are of varying sizes and overlap one another; the elements of one complex may extend onto the territory of location (? -- Yu. Saushkin) of another complex, and there are transitional zones" (Alampiyev, p. 71). In Alampiyev's view, this gives rise to controversial problems regarding the number, the composition and the boundaries of regions, and he concludes that "the working out of a regional network may have several possible solutions, several variants" (Alampiyev, p. 71).

It is quite evident that very little remains from the author's original statements regarding the objective existence of regions. Of course, no one has drawn the boundaries of economic regions on the territory of the country, but those regions exist in reality (as "economic unities" or regional complexes) and they must be thoroughly investigated before they can be mapped. And this will disclose such a deeply reasoned scientific variant which alone will be closest to reality and which alone will most faithfully reflect the outlines of the objectively existing regions (taking account of their prospects of development).

The important role of government decisions in the development of regions under a planned economy is well known. But those decisions, in turn, must be based on a scientific regionalization and on the objective laws of formation and development of economic regions. I do not think that Alampiyev could cite examples of such scientifically grounded government decisions relating to the development of economic regions that did not take account of the natural and manpower resources of these regions, of the historically formed complex of productive forces and of the place they occupy in the territorial division of labor, i.e., all the characteristics of objectively existing territorial production complexes.

Of course, there are always several variants of plans, different points of view regarding the construction of large enterprises and the order of priority in the development of new areas, but in the end a single variant must be selected.

Alampiyev writes that in regionalization "there is no guarantee against errors," that "sooner or later the course of events will disclose these errors and call for correction" (Alampiyev, p. 71). But suppose it is later rather than sooner? Alampiyev acknowledges that errors in planning result in excessive expenditure of forces and funds, in a reduction in the rate of development and in losses to the economy of social labor compared with a more correct regionalization (Alampiyev, p. 71). But that is why we have a science

in order to avoid committing those errors, which is especially important nowadays when rates of development and economies of social labor play such a significant role in the economic competition between the Soviet Union and the United States. And what is meant by that "more" correct regionalization? It means that there must be a striving toward the very thing that Aleksandrov proposed and Alampiyev rejects -- a single real solution approaching reality as completely as possible. Of course, on the way to that solution there can be, and should be, many variants, but only on the way, on the approaches. Modern science disposes of (and is in the process of working out) methods for assessing the correctness of regionalization as a true reflection of actual reality. These methods include the construction of models of regional complexes of productive forces, regional balances, the calculation of the rationality of given inter-regional economic relations, measurement of the level of regional specialization, comparison of regional per capita indices of production and consumption, and so forth. Experimentation with electronic computers will assume increasing importance in the future. One can, in particular, calculate the optimal variant of assigning a given point or node to various economic regions based on the maximum economy of social labor thus achieved. All that is necessary is not to hesitate to use these indices and to grapple with the problems related to economic regionalization. Equally important is the methodological basis of regionalization, which, it would seem, has already been adequately worked out. Soviet economic geographers should firmly adhere to the concept of the objective existence of a system of regions and leave no "loopholes" for the subjective concept of regionalization, which can only interfere with the realization of the great and practically important task of a scientifically grounded long-range economic regionalization of the USSR and other Socialist countries.

BOOK REVIEW

V. A. Anuchin, Teoreticheskiye problemy geografii (Theoretical Problems of Geography). Moscow: Geografgiz, 1960, 264 pp. (reviewed by N. N. Baranskiy).

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1961, No. 2, pp. 76-77)

In recent years there have been several studies discussing from different points of view certain questions of the theory and methodology of both physical and economic geography. V. A. Anuchin's book under review is of a different quality. For the first time in the Soviet Union we have here a book that discusses the basic problems of all geography and offers an integrated theoretical concept of geographic science.

As the author himself emphasizes, his book does not claim to offer an exhaustive solution of all problems. But it should be stressed right here

that for each concrete problem the book gives, if not a solution, at least the direction of a solution. The extremely complex problems posed by the author are solved by him from the point of view of Marxism-Leninism, creatively and without dogmatism, which incidentally also insures the correctness of the basic theoretical propositions advanced in the book.

Attention should also be called to the fact that for the first time in Soviet literature the history of development of geographical ideas is treated not "for its own sake" but against the background of and in close relationship with the development of philosophy. Anuchin demonstrates quite convincingly the link between geographical ideas and philosophic concepts.

The author of the book under review takes the point of view of the unity of geography. His book is the first, and so far the only one, to offer an integrated and comprehensive idea of the essence of the unity of geographic science, as determined by the common character of its subject matter and its method. Anuchin does not confuse physical and economic geography; he clearly defines the specific, fundamentally important differences between them, but at the same time he also correctly justifies the possibility of general geographic research.

At the present time, when a one-sided, excessively specialized development of geography is producing a harmful trend toward the complete "disintegration" of geography, the publication of a theoretical work justifying the possibility of general geographic synthesis is especially valuable and topical.

Anuchin's arguments against the "distributive" definition of the subject of economic geography look convincing. In no way rejecting, but, on the contrary, emphasizing the importance of the problem of distribution of social production, the author says that distribution is only one aspect of development, studied by all concrete sciences (particularly, the economic, technical and geographic sciences). The concrete sciences study material objects and the forms of matter, but not distribution, which is only one form of the existence of matter. While rejecting distribution as the subject of economic geography, Anuchin regards it as one of the methodological categories without which no geographic research is possible.

Starting from the premise of the common subject matter of all geographic sciences, Anuchin holds that geography assumes a "transitional" position in the over-all system of sciences. He writes: "Geography as a whole can, consequently, be called a transitional field of human knowledge between the natural and social sciences" (p. 141). The book consistently develops the idea that geography studies nature and society not isolatedly but as parts of a more complex whole. It is not the internal laws of development of nature and society that geography studies (that is done by other sciences), but the internal laws of development of the more complex whole (the geographic environment) and those territorial complexes that are formed as a result of the interaction of nature and society.

In discussing the problem of the meaning of the geographic environment (which the author treats in a broader sense that is usually the case) for the life of society, Anuchin comes out, on the one hand, against geographical determinism and, on the other hand, against a nihilistic underestimation of the environment, which he aptly calls geographical indeterminism. The geographical environment in itself does not determine the historical process of social production, but in a number of cases it exerts, in intermediary form, a decisive influence on the development of the economy. Anuchin is the first to have formulated this proposition so clearly. And it is a very important proposition. It was precisely a lack of understanding of the situation that led to the stereotyped approach to economic management, repeatedly condemned by the party, and to the ignoring of the local peculiarities of natural and economic conditions.

It should be pointed out that although Anuchin's study is devoted to theoretical problems of geography and is closely related to philosophy, it is nevertheless of practical importance.

Schematism and stereotype in economic management has often been and continues to be a result of a nihilistic attitude to the geographic environment. This was noted even by Comrade N. S. Khrushchev in his speech to the plenum of the party's Central Committee in January 1961. In listing the reasons for shortcomings in the location of hydroelectric projects under construction, he emphasized in particular the following: "In that connection I want to say that we still don't know well enough our country and its rich resources."

As Anuchin properly notes, geographers are participating on a still extremely inadequate basis in economic construction and long-range planning. It is also true that geographers are very "poorly organized" in institutions concerned with economic planning, and in some cases are completely lacking where, it would seem, they should play a very important role. The suggestion that has been made to create a special geographic agency is of national importance, and we have no doubt that, as time goes on, it will be realized in one form or another.

Anuchin's book is the result of many years' labor. It is a bold and, at the same time, a deeply scientific work. The reading of a vast body of books and articles and a great deal of thought necessarily had to precede the writing of any of the seven chapters of the book under review, one of whose merits is its strict consistency of exposition and its precision of language. And this in turn is an important attribute for a book of great ideological significance. Let us hope that Anuchin's book will be much in demand, both in the Soviet Union and abroad.

Of course, shortcomings are unavoidable in such a complex work, but they do not to any great extent reduce its significance. It seems to us that the book is short on concrete examples, which would have helped a great deal to prove the theoretical propositions advanced by the author. Saturation

with such examples would have made the book more accessible to the broad masses of readers. Although the inclusion of concrete material would require a substantial increase in the size of the book (perhaps to twice its present size), this should be done in a new edition.

Anuchin's treatment of the problem of the geographical division of labor in relation to regionalization is clearly inadequate. There are also a few contradictions and errors in other parts of the book. For example, while he correctly shows the differences and the relationships between economic-geographic and governmental economic regionalization (the first being the scientific basis of the second), Anuchin sometimes errs in equating these two types of regionalization. His thesis about the geographical method in economic construction is unsupported and literally "hangs in the air" (see p. 230). The book also contains some inaccuracies and contradictions in the use of terms. But in conclusion it should be said that Anuchin's book is in no way a collection of axioms. It undoubtedly contains parts that are open to discussion, but far fewer than is indicated in the publishers' foreword. And it would hardly be correct to regard the entire book as open to discussion, as the foreword would have it.

Anuchin's book deserves special study and discussion among geographers, and perhaps not only among geographers. As a result of such discussion it should be possible to write a book, based on the work under review, that would be called "Theoretical Principles of Geography." There has long been a need for such a book. At the present stage of development of geography Anuchin's book is the only one of its kind and its great value is completely obvious.

NEWS NOTES

By Theodore Shabad

New Network of Major Economic Regions. In May 1961, the Soviet Union announced the adoption of a new system of 17 major economic regions for long-term planning and development purposes (Ekonomicheskaya Gazeta, May 28, 1961). Adoption of the new regional system followed a lengthy discussion of the merits of various systems of economic regions proposed by different authorities. (Several articles representing different points of view were published in Soviet Geography, April, June, September and October 1960.)

The new economic regions will be headed by Coordination and Planning Councils that will coordinate and plan the activities of the Regional Economic Councils under their jurisdiction. The Regional Economic Councils (Sovnarkhozes) are charged with day-to-day management of industry and construction within the so-called administrative-economic regions. The present regional

system of industrial management, which divides the Soviet Union into about 100 administrative-economic regions, replaced in 1957 the system of centralized industrial management by specialized ministries (see Soviet Geography, June 1960, p. 60).

The principal changes between the previous system of 13 regions and the new system of 17 regions are:

1. In the RSFSR, the former Northern and Northwest regions are combined into a single Northwest region. The former Central region is divided into three regions: Central, Central-Chernozem and Volga-Vyatka. Kurgan and Tyumen' oblasts are transferred from Western Siberia to the Urals.
2. The Western region, which formerly included the three Baltic republics and Belorussia, is limited to the Baltic republics under the new system. Belorussia remains a separate administrative-economic region outside of the new system of major economic regions.
3. The Ukraine, which under the previous system was joined with Moldavia in the Southern region, is divided into three major economic regions under the new system: Donets-Dnieper, Southwest and South. Moldavia, like Belorussia, remains a separate administrative-economic region.
4. The former Central-Asia--Kazakhstan region is divided into separate Central Asia and Kazakhstan regions.

The new system of 17 regions thus consists of ten regions in the RSFSR, three regions in the Ukraine, one region of Kazakhstan and three inter-republic regions. The composition of the major regions in terms of their constituent administrative-economic regions follows, together with the seat of the coordinating council:

Northwest Region: Leningrad, Karelian, Murmansk, Kaliningrad, Arkhangel'sk, Komi and Vologda administrative-economic regions. Seat: Leningrad.

Central Region: Moscow City, Moscow Oblast, Kalinin, Yaroslavl', Kostroma, Ivanovo, Vladimir, Ryazan', Tula, Kaluga, Bryansk and Smolensk regions. Seat: Moscow.

Volga-Vyatka Region: Gor'kiy, Kirov, Chuvash, Mari and Mordvinian regions. Seat: Gor'kiy.

Central-Chernozem Region: Voronezh, Lipetsk, Tambov, Orel, Kursk and Belgorod regions. Seat: Voronezh.

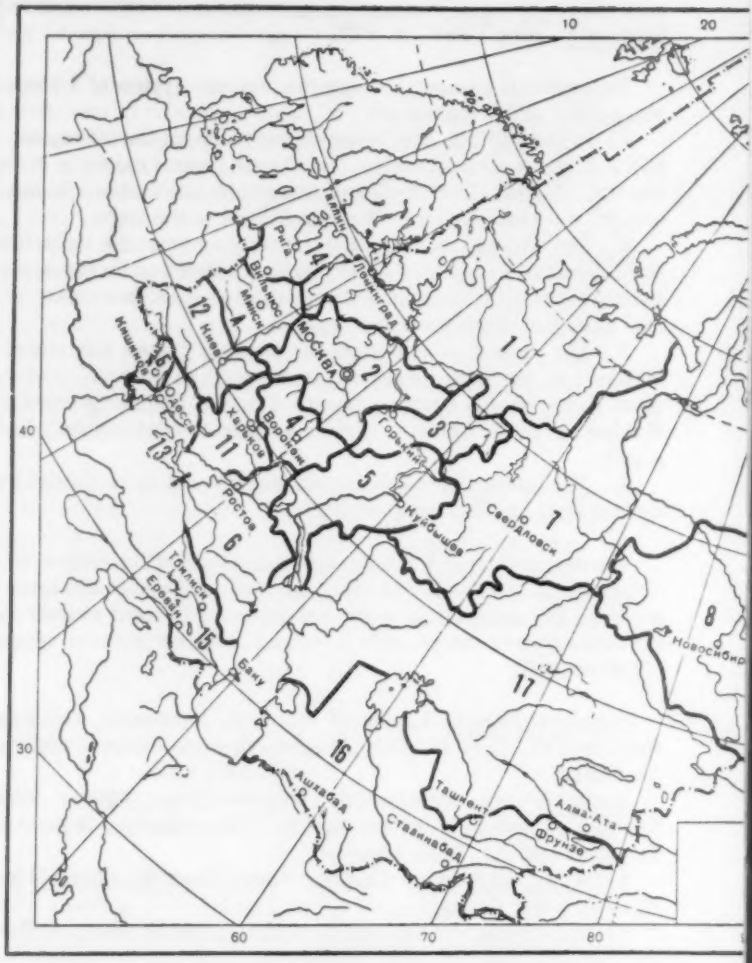
Volga Region: Kuybyshev, Tatar, Ul'yanovsk, Penza, Saratov, Stalingrad and Astrakhan' regions. Seat: Kuybyshev.

North Caucasus Region: Rostov, Krasnodar, Stavropol', Kabardian-Balkar, North Ossetian, Chechen-Ingush and Dagestan regions plus the Kalmyk ASSR (which does not have a separate regional economic council in view of its low level of industrial activity). Seat: Rostov.

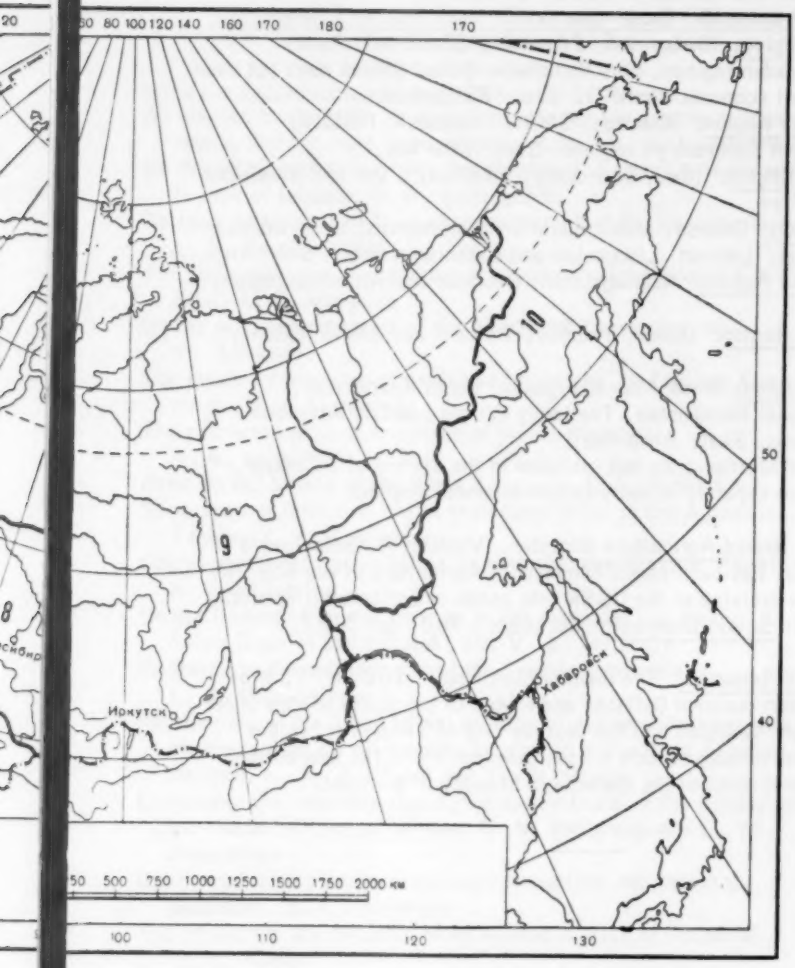
Urals Region: Sverdlovsk, Chelyabinsk, Perm', Bashkir, Udmurt, Orenburg, Kurgan and Tyumen' regions. Seat: Sverdlovsk.

West Siberian Region: Novosibirsk, Kemerovo, Tomsk, Altay and Omsk regions. Seat: Novosibirsk.

MAJOR ECONOMIC REGIONS OF THE USSR



1. Northwest
2. Central
3. Volga-Vyatka
4. Central-Chernozem
5. Volga
6. North Caucasus
7. Urals
8. West Siberia
9. East Siberia
10. Far East



11. Donets-Dnieper
12. Southwest
13. Southern
14. West
15. Transcaucasia
16. Central Asia
17. Kazakhstan

A. Belorussian SSR
B. Moldavian SSR

East Siberian Region: Irkutsk, Krasnoyarsk, Buryat, Chita and Yakut regions, plus Tuva Autonomous Oblast (which does not have a separate regional economic council). Seat: Irkutsk.

Far Eastern Region: Khabarovsk, Primorskiy (Maritime), Amur, Sakhalin and Magadan regions, plus Kamchatka Oblast (which does not have a separate regional economic council). Seat: Khabarovsk.

Donets-Dnieper Region: Khar'kov, Stalino, Lugansk, Poltava, Dnepropetrovsk and Zaporozh'ye regions. Seat: Khar'kov.

Southwestern Region: Kiev, Cherkassy, Vinnitsa, L'vov and Stanislav regions. Seat: Kiev.

Southern Region: Odessa, Kherson and Crimean regions. Seat: Odessa.

Western Region: Latvian, Lithuanian and Estonian regions. Seat: Riga.

Transcaucasian Region: Azerbaydzhan, Georgian and Armenian regions. Seat: Baku.

Central Asian Region: Uzbek, Tadzhik, Turkmen and Kirgiz regions. Seat: Tashkent.

Kazakhstan Region: Alma-Ata, Karaganda, South Kazakhstan, Semipalatinsk, East Kazakhstan, Tselinnyy (Virgin Lands), Aktyubinsk and Gur'yev regions. Seat: Alma-Ata.

Belorussia and Moldavia are not included in the system of 17 major regions and remain separate administrative-economic regions.

Geographer Is Named Agriculture Minister. Vladimir P. Sotnikov, a Soviet geographer, has been named Minister of Agriculture of the RSFSR. His article on the division of the USSR into zones of agricultural specialization appeared in Soviet Geography, December 1960, pp. 3-22.

Uzbek Town Is Renamed. The town of Mirzachul', 100 km. SSW of Tashkent, has been renamed Gulistan and raised to the status of city under oblast jurisdiction. Gulistan and the near-by city of Yangi-Yer, to the south, are the two support centers for the development of the new cotton-growing irrigation district of the Golodnaya Steppe, to the west.

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